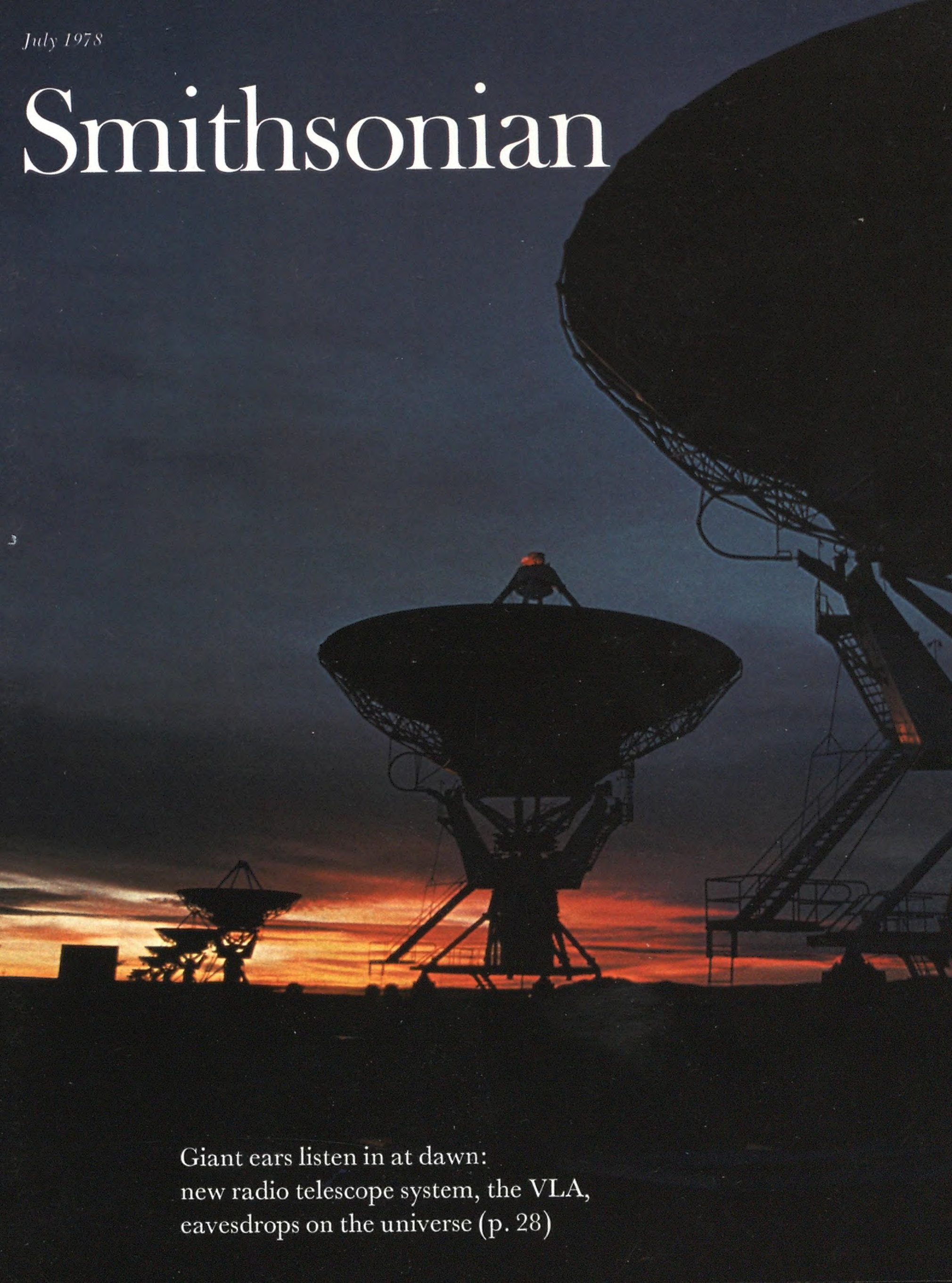
July 1978

Smithsonian



Giant ears listen in at dawn:
new radio telescope system, the VLA,
eavesdrops on the universe (p. 28)

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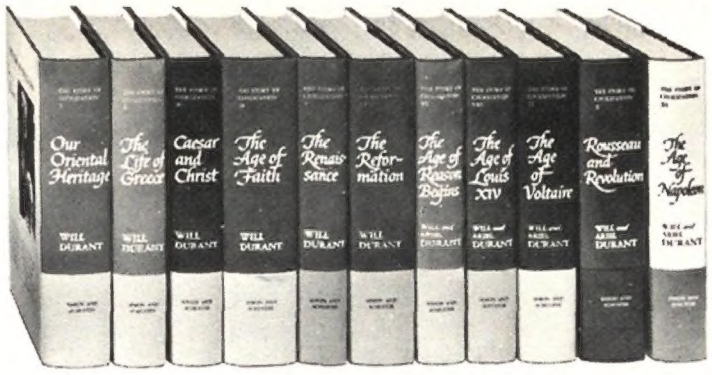

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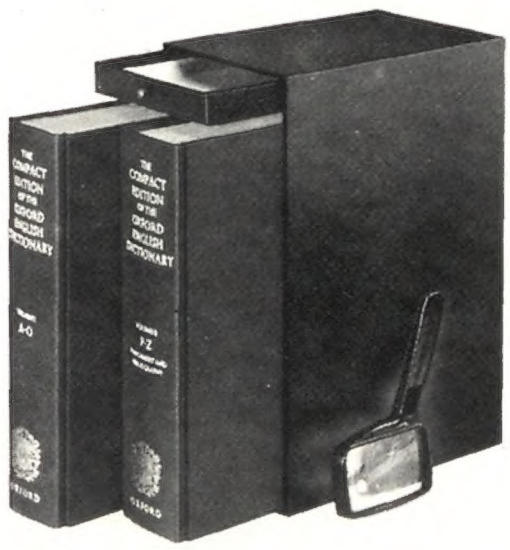

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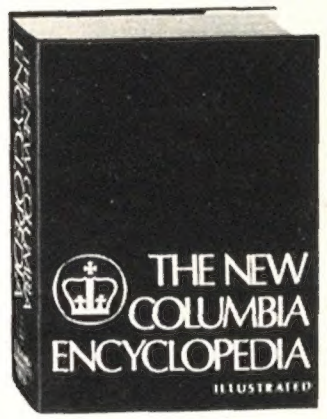

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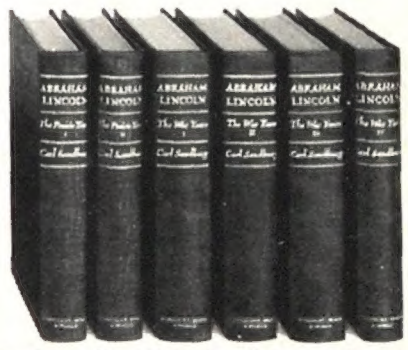

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July 1978

Smithsonian

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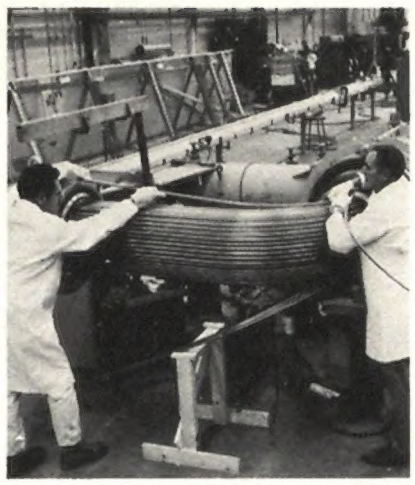
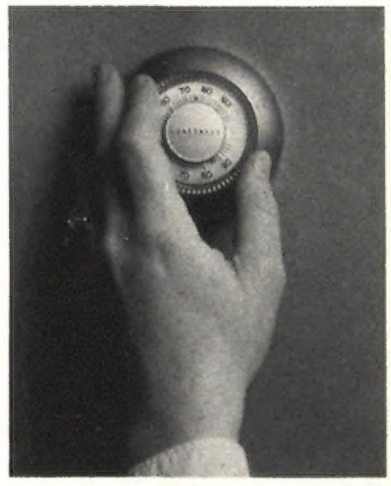
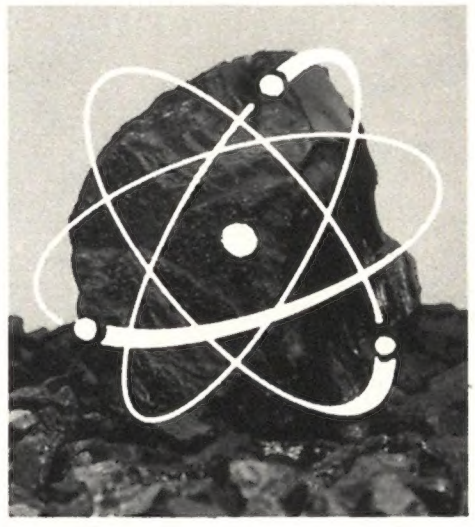




Consumers—what's your stake in energy independence?



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Secretary Ripley's comments

The view from the castle

Leonard Baskin statue of Spencer Baird honors the Smithsonian's second Secretary, pioneer ecologist and eminent collector

A hundred years ago—on May 13, 1878—the first Secretary of the Smithsonian, Joseph Henry, died. Four days later, the Regents asked Spencer Fullerton Baird, the Assistant Secretary, to lead the Institution. A youthful prodigy, in part self-taught, he was learned in languages, chemistry and calculus, and a friend of John James Audubon; when Henry took him on as an assistant in 1850, he was a professor of natural history and the librarian at Dickinson College in Carlisle, Pennsylvania.

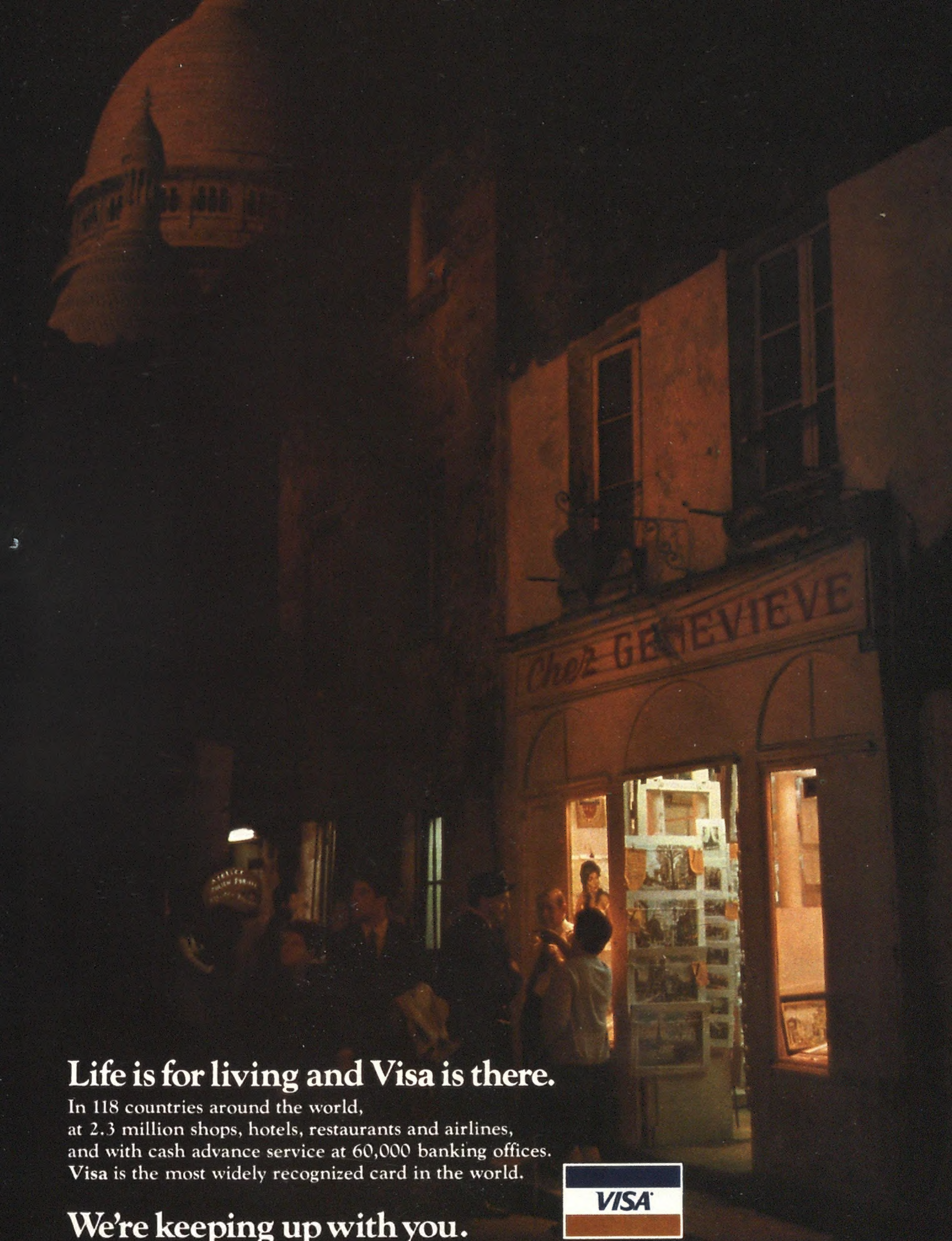
Little did Henry anticipate that, along with Baird, he was also acquiring the greatest omnium-gatherum in the country. Baird, then 27, arrived from Carlisle with his family *and* his personal collection in two whole freight cars: 4,000 bird skins, several thousand eggs and nests, 500 glass jars, barrels, kegs and tin vessels of reptiles and fishes, 600 skulls and skeletons, and a liberal assortment of bird, mammal, frog and toad embryos, not to mention a wealth of fossil bones dug up in caves of Pennsylvania and Virginia. Henry always despaired of the continual accretions to the collections. He did not want "samples of spoon baits. . . . series of domestic turkey feather dusters" and "grasshoppers, from Indiana," to cite the Report for 1876. But not Baird!

In some ways Baird was the perfect foil for Henry. Both had an omnivorous appetite for learning and scholarship, but Baird was the museum man, the collector par excellence. Everything was accepted, nothing rejected. Early accessions included "sealed bottles containing water from the Dead Sea," a "chicken with four legs," a "living duck hatched in Connecticut" and, *pace* Joseph Henry, "three fish hooks from Thomas Day, keeper of Seguin Light."

Baird's great influence was as an early ecologist, perhaps our earliest. Concerned with the decline of fisheries on the East Coast, he started the U.S. Fish Commission and became its first, unsalaried, commissioner, in addition to his many other duties. He produced during his administrative career well over a thousand publications, no inconsiderable feat in those days when people wrote without benefit of ghost-writers. His works on birds and fishes alone were the commanding publications in natural history of their time. Baird's particular monument was the Arts and Industries Building, next to the castle, created to exhibit the material brought back from the Philadelphia Centennial Exposition of 1876, which he helped to organize. This is the building that the Smithsonian restored for the Bicentennial and filled with machines and products of a hundred years ago, still on exhibit.

Having developed the public side of the Institution, Baird died in 1887. The Congressional members of the Board of Regents attempted to have Congress authorize a statue of the second Secretary, but the bill —passed more than once by the Senate—always died in the House. Now the Regents, mindful of tradition, have honored the most distinguished naturalist of the 19th century by commissioning a statue from the renowned American sculptor Leonard Baskin (see p. 16). It stands in the Institution's Victorian Garden near the two buildings which he loved and over which he presided so unflaggingly.

S. Dillon Ripley



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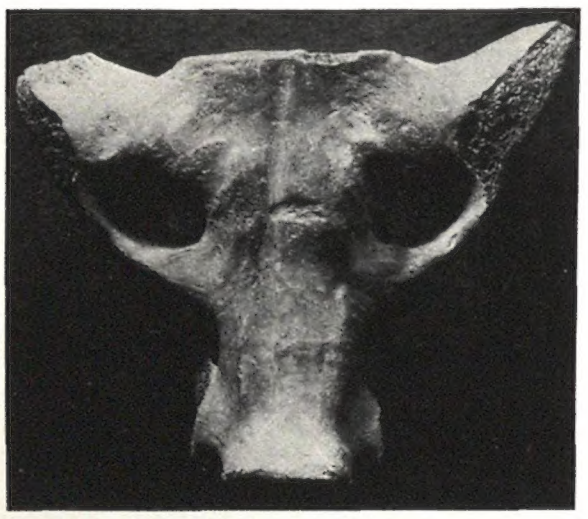
Letters to the Editor

Mexican art

Dear Sir: Sometimes I find it hard to establish empathy with pre-Columbian art, but your May cover helped. The ancient Olmec head reminded me vividly of George C. Scott playing General Patton.
Oleg Hoeffding
Santa Barbara, California

Dear Sir: Your cover portraying the colossal Olmec stone head seems to be a premature political ploy for the 1980 campaign, showing Gerald R. Ford in his 1934 football helmet.
Dabney H. Maury
Delray Beach, Florida

Dear Sir: I was disappointed that you didn't have a photograph of the oldest object, dating back 12,000 years, which you described as an animal bone.
D. Everett Smith III
Los Angeles
It is a carving of the sacrum of what is believed to be the extinct ancestor of a member of camel family (see below). Ed.



SETI

Dear Sir: Although I wholeheartedly agree with the case made by Carl Sagan in his article on the search for extraterrestrial intelligence, I question that "the existence of a single message from space will show that . . . the civilization transmitting the message, after all, has survived," thus, perhaps, serving to dispel fears that our "system . . . is destined soon to collapse."

As Professor Sagan points out, we sent an interstellar message in 1974, which will not be received at its intended destination—a collection of stars called M13—for 24,000 years. At that time, are the receivers in space to conclude that *we* have survived?
Sonja Gremillion
Bristol, Connecticut

Dear Sir: Realizing that a society more backward than ours would not have radio astronomy, Sagan then assumes that any message we may receive will come from a superior technology. At the same time he concedes that such an advanced society may not necessarily be motivated to communicate with us in the first place, and less still to provide answers conducive to our survival.

It would thus seem that any messages we may receive would have been sent by a society in the early phases of radio astronomy, experimenting as we ourselves are now doing at this stage of our evolution. In which case, considering a minimum time period of 300 years for the transmission of the signal, it can safely be assumed that no great message of salvation will reach us before we have solved our own destiny.
Leslie G. Cawthorne
Lutherville, Maryland

Dear Sir: There may indeed be intelligent life lurking in the universe, but I must question the intelligence of those individuals on Earth who designed the metal greeting cards aboard Pioneers 10 and 11.

To the thoroughly objective eye (or whatever our friends in space may use for seeing), the man shown on the card is in a decidedly dominant and active position while the woman is not only passive, but isn't even paying attention to what is certainly the most momentous occasion of her life!

While I do try not to be overly sensitive toward the way in which women are often represented on this planet, I wish that the image we hope to project in the galaxy were of a higher caliber than that depicted.

Your caption states, "Pioneer may continue journey after mankind has perished." Wouldn't it be wonderful to have our neighbors in the universe behold men and women not in dominant and passive terms as drawn, but as we would have hoped to encounter them—as equals?
Cynthia Aronoff
New York City

Dear Sir: In the June "Letters to the Editor," you published a picture of Pulitzer Prize winner Gaylord Shaw, who wrote your article on hazardous dams. Shouldn't Carl Sagan, another Pulitzer Prize winner, get equal treatment?
Patricia A. Miller
New York City
Yes. (See below). Ed.

© Jill Krementz 1978

Sagan's prize, in general nonfiction category, was for *The Dragons of Eden.*

Nez Perce

Dear Sir: In Edwards Park's article on the Battle of the Big Hole, I regret that there is no mention of General Howard's aide-de-camp, Lt. Charles Erskine Scott Wood, who personally took down Chief Joseph's surrender speech and was in later years to become a prominent American poet and author *(The Poet in the*

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Desert, Heavenly Discourses). Wood played a major role in securing the return of Joseph to the Northwest, and he even sent his son (now 98, and living in Vancouver) to visit Joseph.
Eric C. Walla
Vancouver, Washington

Edison's phonograph

Dear Sir: As an addendum to Harold C. Schonberg's article, "Edison started the big noise a century ago," I discovered in writing *The Washington Post: The First 100 Years* that Edison, then 31, visited the Smithsonian on April 18, 1878, to give a demonstration of his phonograph. "He gave a *Post* reporter a prophetic preview, declaring that 'this tongueless, toothless instrument, without larynx or pharynx, dumb, voiceless matter, nevertheless mimics your tones, speaks with your voice, utters your words, and centuries after you have crumbled into dust will repeat again and again, to a generation that could never know you, every idle thought, every fond fancy, every vain word that you choose to whisper against this iron diaphragm.' "
Chalmers M. Roberts
Washington, D.C.

Dear Sir: In reference to your statement that "the exact date of Edison's invention is unknown," I would like to point out that Charles Batchelor's laboratory notes place the actual working days as December 4, 1877, when it was begun, through December 6, when it was completed. I took advantage of this December 6 date and presented a session for the New York State School Music Association on the actual 100th anniversary.

No matter; the article is timely, comprehensive and wonderfully succinct, as well as loving.
Milford H. Fargo
Professor of Music Education
Eastman School of Music
University of Rochester
Rochester, New York

Dear Sir: The Schonberg article perpetuates the half-truth that long-playing records did not exist before 1948. While this was the case for music recordings, the fact is that blind people were using the LP record 14 years earlier. But there was another name for it—the "Talking Book."

Investigation of the possibility that blind people might be enabled to read with their ears as well as with their fingers began as early as 1924. It took about eight years for the American Foundation for the Blind to work out the technical details of both an LP disc and a playback machine that could reproduce the spoken voice with fidelity, and another two years to persuade the Library of Congress to allow Talking Books to be included in the Books for the Blind program that Congress had authorized in 1931. The first ones were produced and circulated in 1934.

In the ordinary course of events, blind people lag behind their sighted fellows in benefiting from technological progress. The early Talking Book was the shining exception.
Frances A. Koestler
Matilda Ziegler Magazine for the Blind
New York City

Father Thames

Dear Sir: Timothy Green's article on the cleaning up of "Father Thames" offered a bright and encouraging picture of progress in the reversal of pollution, up to your statement that five million tons of sludge from the river are being dumped in the North Sea every year. This appears to be a shifting of the problem to an alternate victim rather than a solution to it. Perhaps the fish are returning to the river to escape the sea.
Wendell Mason
Burlingame, California
Sludge is dropped by two ships every day about 20 miles offshore, at a point called Barrow Deep, where it reportedly disperses rapidly. There are about 700 drops a year, which averages a little more than 7,000 tons of sludge being unloaded into the North Sea daily. Ed.

Dear Sir: I would like to point out that the author has ignored the pioneer work of the former London County Council, when he states that a strategy for salvation did not emerge until 1961.

In 1955, I joined the London County Council as naval architect, and one of my first projects was to design a multipurpose launch with a fitted laboratory, for two chemists to make an instant analysis of the river water at half-mile intervals. This analysis was made every day, and a careful check was made of the position of any dangerous contents found in the water. A team would go ashore and investigate all the warehouses, factories, garages, etc., in the vicinity of the nearest sewage outlet.

I left the service in 1961 when the results of the program were just becoming apparent, together with a similar program whereby air pollution in London was being mastered by progressively prohibiting coal fires.
George F. Campbell
Brooklyn, New York

Pots and pans

Dear Sir: Learning about the eminently sensible location of Mrs. Patrick Ryan's salad bowl has caused me to develop a chronic case of convulsive chuckles. But I'm willing to risk an acute attack of the same ailment if you will publish a companion piece by Mrs. Ryan on the subject of Patrick's organization of the vital materials in his garage.
Mrs. Olyn K. Ruxin
University Heights, Ohio

Nightmare waves

Dear Sir: At the Offshore Technology Conference in Houston in May, I ran into some confusion arising from my February article on nightmare waves. In that article, I included a discussion of the highest possible waves in the Gulf of Alaska, where oil companies hope to use offshore platforms. I reported that Wilfred R. McLeod of the Marathon Oil Company said extreme waves there are no higher than those in the northern North Sea: around 100 feet. But, in the editing, another estimate (198 feet, double that of McLeod's)—this one reported by John Freeman at the Institute for Storm Research in Houston—was mistakenly attributed to McLeod. This editorial correction is important, because 200-foot waves would preclude offshore platforms.

Still another estimate was presented at Houston, from a new study done for the U.S. Geological Survey, which sets design standards for offshore structures. This study found that waves up to 135 feet high might form in the open reaches of the Gulf, while closer to shore, where the rigs would be, the highest storm waves could be on the order of 113 feet.
Peter Britton
New York City

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*Eastman Kodak Company, 1978

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The man in the middle just won a big award.

This is the true story of the victim of an automobile accident.[1] Let's call him Phil.

A jury has finally[2] awarded Phil $12,000 for his losses (and the court tacked on $1,160 for costs), so why isn't *he* smiling?

Watch closely as the tort system gobbles up that $13,160:

Phil's lawyer (at right) takes $6,450 off the top.[3]

Dr. A (at left) gets $600 in witness fees. (He charged only $425

for treating Phil in the first place—in this crazy system you sometimes make more by telling a court what you did than you make by actually *doing* it.)

Doctors B and C take $325 more in witness fees and another $470 or so falls through the cracks, leaving Phil with a check for $5,311[4]— nearly three years after his accident.

Now a system that used up 3 years and $8,000 to put $5,300 into a victim's hands may strike you as unwieldy. And Ætna agrees.

State by state, we're supporting strong, workable "no-fault" auto insurance plans.[5] Where no-fault isn't in the cards, we think compulsory arbitration can help get most cases settled faster and more economically.

Lawyers' contingent fees should be better controlled. And, where appropriate, victims' payments should be made periodic, rather than in one lump sum which some outlive and others never need.

Passing the laws to reform this system is slow, frustrating work, but it is the key to controlling auto insurance costs. Don't underestimate your own influence with your elected representatives. Use it as we are trying to use ours.

Ætna wants insurance to be affordable.

[1]We've taken poetic license and put a neck brace on Phil, although his actual injuries didn't require it.

[2]Nearly three years passed between Phil's accident and his award. Such time lags are often a cause of grave hardship, and are a strong indictment of the present tort system. Chief Justice Warren Burger put it this way: "The business of involving the judicial process to dispose of an automobile accident is an expensive and cumbersome method that should be abandoned, as we did with industrial-injury claims long ago."

[3]Lawyers handling liability cases generally charge a "contingent fee"—a percentage of the award paid to the victim (the percentage may be as high as 50%). Phil's lawyer claimed 40% of the jury award for his fee plus $1,650 for certain costs advanced. He later advised the press that he had reduced his fee.

[4]In other words, only 44% of the jury award actually reached the victim. More than half was consumed by the costs of an inefficient system—costs which are reflected in the premiums of insurance buyers.

[5]"No-Fault" is first-party protection. Your insurance covers *your own* medical expenses and lost wages; the losses of whomever you hit (or get hit by) are covered by *his* insurance. No-fault has enormous potential for speeding and simplifying claim payments and controlling the cost of auto insurance. Unfortunately, the no-fault laws in many states (including the state where Phil lived) have so many loopholes that they fail to keep most claims out of court. Ætna supports the passage of federal guidelines which would require states to enact strong laws with real consumer protection.

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LIFE & CASUALTY

Around the Mall and beyond

Just as you get to know a person, off he or she goes. Back during the filming of the 1876 exhibit (in this column for September 1976) I became intrigued with Peter Marzio, Curator of Prints in History and Technology's Division of Graphic Arts, because he played a part in that film and so did I. Neither of us could be called stars, exactly, but Peter, dressed up in a houndstooth jacket with an early version of a Derby perched on his head, was described by another of the Smithsonian cast as "looking like the piano player in a New Orleans bordello," and I have liked the man ever since. Now he is leaving us to become director of Washington's Corcoran Gallery of Art.

To celebrate this appointment and hastily to make further acquaintance with a person who can excite such a descriptive flight, I wasted no time in bustling over to Marzio's office. He was busy with his last exhibit, "Cut on Wood: The Art of Wood Engraving in America," which opened last month. The art in question came to this country in the 18th century, helped illustrate a good bit of our early history and is now pretty much lost.

In his pleasantly untidy office, Peter told me about some of his earlier exhibits. He has been sort of an enfant terrible at that museum since switching from history (research assistant to former director Daniel Boorstin, then historian in his own right) to the job of Curator of Prints, for he has always been dogged by a rather disturbing question: "How does art function in a democracy?"

"We were on our way, in the 19th century, to the first true democracy," he told me. "So we no longer had art provided by the Church or the rich patron. We had to assemble our resources to produce an American art, and we had to inspire the average American to look at it."

Peter's prints, of course, were one device in this "democratization" of art. The museum movement was another device. And the Corcoran, opened in the 1870s in what is now our Renwick Gallery, is an early example of a private collection turned into a museum.

Philosophically, then, Marzio is happy with his new task, which begins July 1. Also, he says he is looking forward to the day-to-day administration of the Corcoran—the practical problems of making people happy and raising funds.

I asked my new-old friend what moments at the Smithsonian he remembered especially well. He replied that the night the Henry R. Luce Hall of News Reporting was opened with a grand black-tie dinner for the nation's leading editors and publishers, was the same night that Richard Nixon made his first television

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address on the Watergate investigation.

News of the speech came while the esteemed journalists were sitting at their laden tables in the reception suite in the Museum of History and Technology. Instantly, the mood changed from tuxedo elegance to involvement. A TV set was wheeled in to the dinner and most of the guests pushed back from the table and listened to Nixon.

Not Katharine Graham, publisher of the *Washington Post*. She got up and left the Mall for her office. "I want to be with the troops," she said.

Peter Marzio displays wood engraving from his final Smithsonian exhibit.

The statue of our second Secretary, Spencer Fullerton Baird (see *View from the Castle,* p. 6) was unveiled on one of the rainiest evenings of one of the wettest weeks we've had in Washington for many a spring. Not until the sun finally emerged could we appreciate the sight of Baird standing in the Victorian Garden amid luxuriant lawns and brilliant flower beds, facing the main tower of the castle.

Aside from being the Great Collector for the Institution, Baird was an established ornithologist with a sparrow and a sandpiper named after him in this country and a warbler named for his daughter Lucy. The sparrow, *Ammodramus bairdii,* was found by Audubon—the last bird he described. It hangs around the northern Great Plains. Baird's sandpiper migrates far and wide, but whisks regularly through the interior states.

Lucy's warbler *(Vermivora luciae)* is one of that mind-boggling family of more than 100 species which drives bird watchers nuts. It's supposed to be rather common in the dry Colorado River country.

Presuming, as I always have, that the Smithsonian statues come alive at midnight, one can rest assured that Spencer Baird is at home with his namesake species, also with the starlings that bustle arrogantly around on the grass and squabble in the trees and with Henry the mockingbird (*Around the Mall,* May 1978) who fills the garden with his voice, proclaiming in a hundred tongues his ownership of that particular turf.

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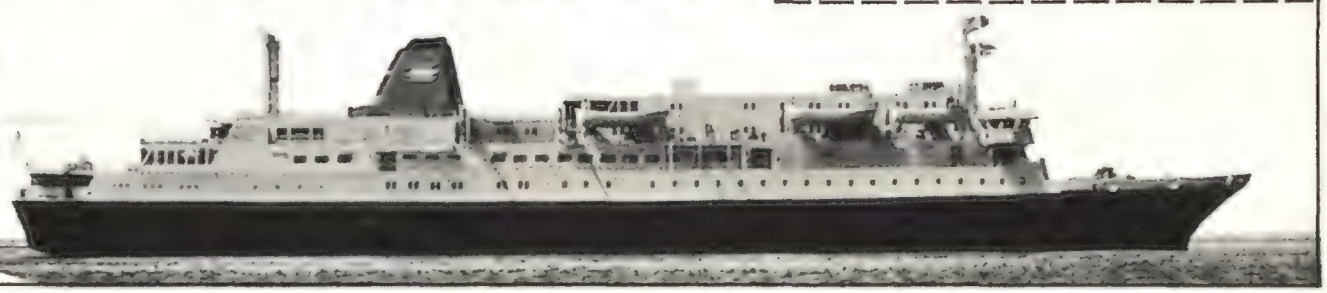

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Baird's hands are crossed behind his back as he stands there. The right hand is cupped. Secretary Ripley was quick to note this hand after unveiling Secretary Baird. "It would be nice," he said, "if a robin nested there."

Yes, and it wouldn't be the first time a bird has taken such liberties with a Smithsonian statue. On the other side of the castle, facing the Mall, stands Joseph Henry, clad in an academic gown. And where this cloak parts between his feet, some starlings are apparently raising a family. They fly in through that gap and then flutter up out of sight.

Of course nothing's sacred to a starling, not even the gown of the first Secretary nor whatever hidden ledge it may form between the gentleman's knees. I expect that at midnight Henry shoos the birds away. He was more interested in physics. Didn't even have a bird named for him (except Henry the mockingbird—*Henricus Mimus polyglottis*).

Secretary Spencer F. Baird extends a hand to tempt a nesting bird.

I dropped in at the National Portrait Gallery at lunchtime and found that what seemed like much of Washington had done the same thing. The big draw, right now, is the exhibit of *Time* covers —107 of them, culled from some 900 in the original donation—which have been hauling hundreds of people off the streets during lunch hour for a quick look and a comment or two.

The nice thing about those comments, says Sue Roschwalb of the museum staff, is that whether pro or con, they're uninhibited and confidently audible. "When most visitors look at a piece of art, they keep quiet and sort of uptight, and if they have anything to say they whisper. But the *Time* covers are apparently familiar enough so that people don't mind voicing opinions right out loud."

They do, too. They couldn't get over the way Nixon looked in 1959 as compared with 1973, or President Carter as Governor of Georgia, and they said so right out loud. "I *hate* that!" said one girl, and I scurried around a partition to see *what*, but I was too late.

Leaving the *Time* exhibit, I visited the Hall of Presidents, just for the sake of paying homage to General Grant's frame. Grant was no great shakes as President, and this portrait of him as general is no great shakes either, it seems to me—glassy eyes, six buttons undone to reveal a pink shirt, hat on crooked. All I can say is, his army was a lot different from the one that *I* knew.

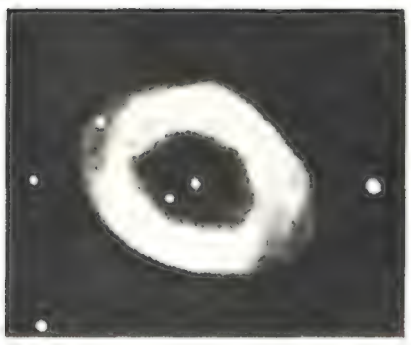
But that frame is something else. It's black with gold trim and at the top it becomes the head and brooding wings of an American eagle, peering down over a seal of American flags to make sure Grant is still there, down below. You feel that the great bird is about to sink its talons into the general's pink shirt and flap off with him to the old aerie.

The uprights of the frame are black columns sprouting dozens of heavy leaves and wrapped around by gold ribbons upon which are inscribed the general's battles: Fort Henry, Shiloh, Chattanooga, Wilderness, Fort Donaldson, Vicksburg, Lookout Mountain and Appomattox.

I learned that Grant's frame weighs 150 pounds. It's a figure the museum has to know because the walls will stand only so much. Other frames are huge, too—Thomas Edison's and of course the giant Washington by Gilbert Stuart, which is big enough to pull the plaster out of an average wall, except that no good American plaster would dare give way under the weight of George Washington.

—Edwards Park

The Curious Magazine.



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Fair play in steel trade:
part of the solution to the steel industry puzzle

trade laws can save lot of other Americans, too.

America's existing trade laws were designed to encourage *fair* trade between our nation and others... and also to prevent damage to *any* domestic industry caused by *unfair* trade practices.

One of America's trade laws states that it's illegal for a foreign producer to sell his product in the U.S. at a price *below* his full cost of production.

That's called "dumping." And that's what foreign steel producers have been doing in recent years. "Dumping" their products in the U.S.—in order to keep their plants running, their people employed. What they do, in effect, is export their unemployment to the U.S.

But "dumping" is not just a steel industry problem. That illegal practice affects many American industries and many hundreds of thousands of workers.

One answer: enforce the existing trade laws

Free trade, yes. But *fair*. We don't think any American industry is asking for too much when it demands *fair play* here in our own country. When it asks our government for vigorous and effective enforcement of existing laws.

Trigger pricing

One attempt to achieve fair play for America's steel industry is the trigger price mechanism implemented by the Administration.

Objectives of the mechanism are (1) to monitor the prices of steel imports into the U.S. and (2) to initiate accelerated anti-dumping investigations of imports priced below the trigger price mechanism.

To be effective, the mechanism must reflect the *full* cost of the foreign producer for steel landed in the U.S. If it does not, it will not really eliminate the unfair trade practice of "dumping."

Still needed: U.S. tariffs on steel

Regardless of the ultimate impact of the trigger price mechanism, we believe that existing U.S. tariffs on steel should be retained. These tariffs are an element of moderation in the international arena for steel trade. They must be maintained until such time as fair and nondiscriminatory world trade in steel has been achieved.

Washington must help

Unfair trade practices, such as "dumping," benefit foreign products and foreign workers at the expense of our own. If you believe the U.S. government should enforce U.S. laws to stop such unfair practices, please write your representatives in Washington and tell them so.

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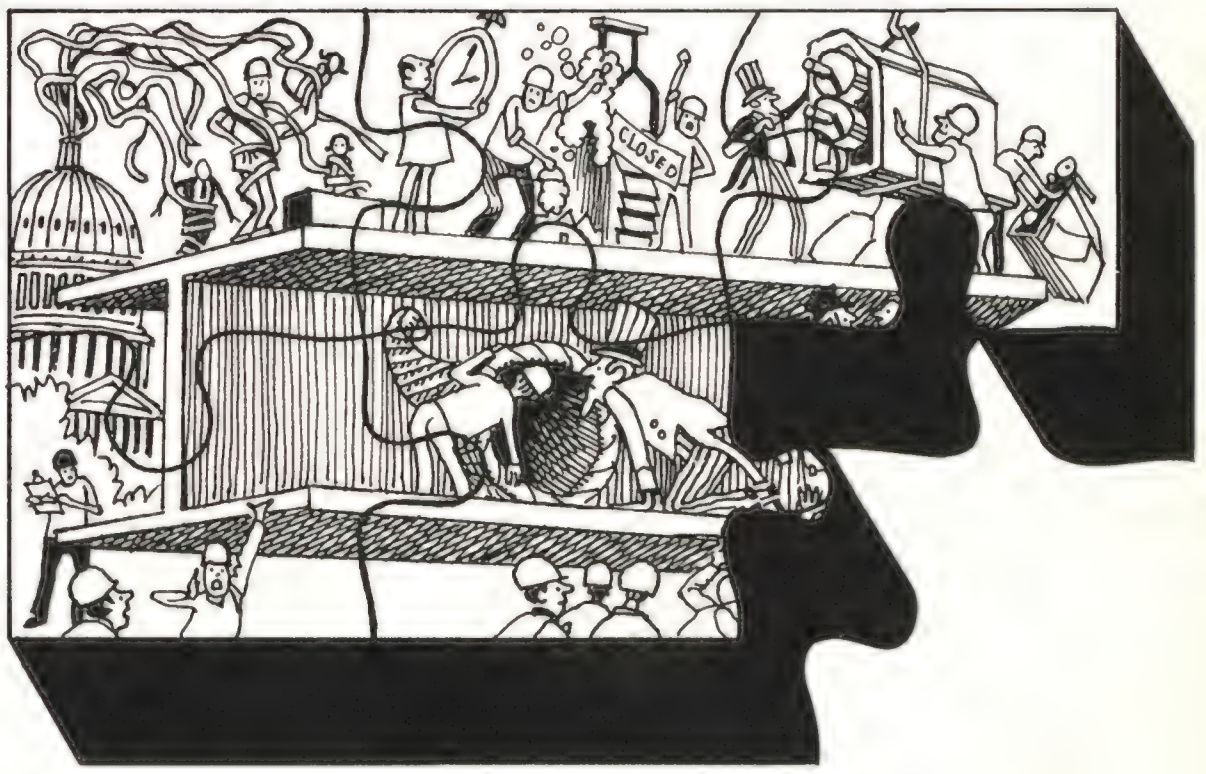

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In search of solutions

Phenomena, comment and notes

Earthquakes in our future, positive fallout from fluoride, expanded ideas about females of the species

The perceptions of the women's movement have begun to influence our understanding of species other than ourselves, and so it should come as no surprise that women zoologists are in the forefront of zooliberation.

Since Darwin's time biologists have been interested in sexual dimorphism, which means that, among many species, one sex is larger or more colorful than the other, or has antlers or some other bodily difference. An extreme example is the northern fur-seal bull, which weighs four-and-a-half times as much as the cow. Another is the male bird of paradise, whose flamboyant nattiness seems all the more flamboyant because of the total dreariness of the female. It has generally been accepted that sexual dimorphism has evolved in cases where one sex has to compete vigorously for a mate and it has been rather smugly assumed that this is generally a male "initiative."

Hold on just a moment, cautions Dr. Katherine Ralls of the Smithsonian's own National Zoological Park. She found some species of mammals where the females were larger than the males, especially among bats and rabbits, and some baleen whales (as at right), seals and antelopes. Why should this be?

One theory is that whichever sex makes the smaller parental investment will compete for mates and will be inclined to be larger. But in most mammal species where females exceed males in size, the males make little contribution to the care of the young, and the males are also the aggressive ones, competing for available females.

The answer may lie in the fact that a bigger mother tends to be a better mother—having larger (or more) young and being better able to feed and defend them. It seems, then, that in some cases the forces of natural selection affecting the females are stronger than those affecting the males. With an insight women readers will no doubt understand, Dr. Ralls suggests that zoological theorists classically focused too much on the males, thus producing a "one-sex" model. This will now have to be replaced with a "two-sex" model.

And to get in a bit of female macho by way of redressing the sins of her brethren, Dr. Ralls points out that the largest animal that has ever lived on the Earth is the blue whale, or more accurately, the *female* blue whale.

More sex differences

Humans, of course, exhibit sexual dimorphism (for which one can be nothing but grateful), but in its subtler forms it can be quite unfair. A recent study showed that common old everyday aspirin had a significantly beneficial effect on men who are stroke prone. This confirmed lab studies showing that aspirin retards blood clotting.

According to *Medical World News* (Vol. 19, No. 7), 12 Canadian medical schools, in a 6½-year study of nearly 600 patients, found a 48-percent reduction of stroke and death for aspirin-taking male patients. Unfortunately, for women the aspirin made no difference at all.

Old debate, new data

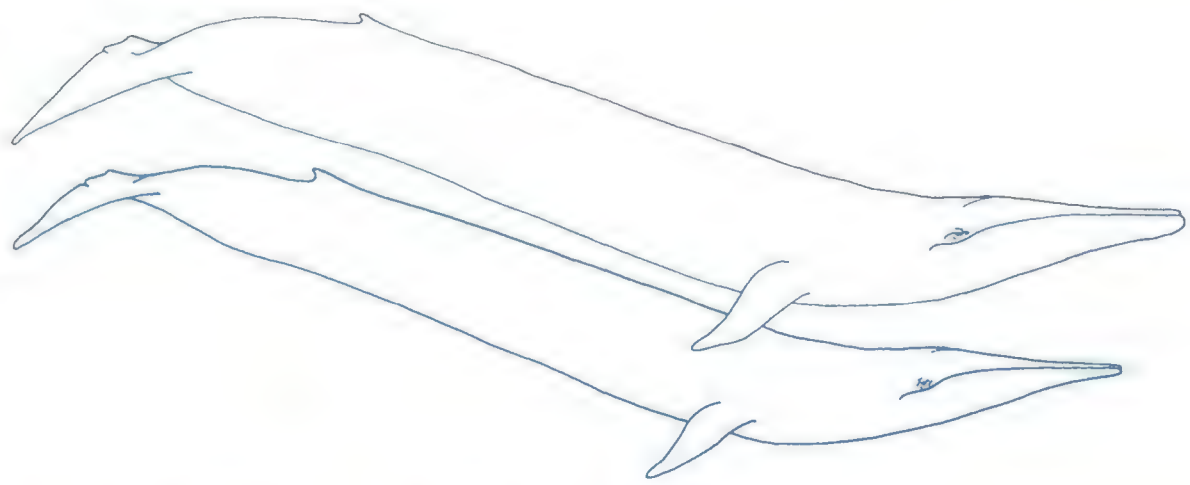
Time was when the hottest debates were over building bomb shelters and fluoridating water supplies. Fluoride proponents made out better than bomb shelter supporters, and it now seems pretty certain that fluoridated water supplies are good for your teeth. There may be some added fallout (of the good kind).

Donald R. Taves of the University of Rochester writes in *Nature* (Vol. 272, No. 5651) that he has found statistical evidence that deaths from heart disease are significantly lower in cities with fluoridated water supplies. It is necessary to look further at specific types of heart disease. The calcification of soft tissue that occurs in ischemic heart disease might be affected by different levels of fluoride in the water.

Progress of a sort

Earthquakes have been much in the American scientific literature recently, not because we have experienced any bad ones in the first third of 1978, but because, unlike the public and its elected representatives, geologists know we live in one world and they don't need a major crisis to get their attention.

The Japanese suffered a reasonably severe one last January: 7 on the Richter scale, 110 landslides and 25 deaths. It occurred 75 miles southwest of Tokyo and buildings in the capital swayed dizzily. But this quake, Japanese scientists say, was merely the foretaste of a bigger one yet to come, already named the Great Tokai Earthquake. Just when the big one will come, no one is certain, but since under the ocean floor, near Tokyo, three



In this pair of typical blue whales, the female (top) is 88 feet long, or seven percent longer than male counterpart. The weight difference is even greater.

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continental plates are gnashing together, two of them pushing up against each other, driving the third underneath (a process called subduction), some scientists feel it will come soon.

Because of its peculiar location—the process of subduction seems to cause earthquakes with especially widespread effects—Japan is one of the most dangerous places to be, but a rather large portion of the American population lives on the other side of the Pacific, along our side of the ring of fire, and American geologists are mindful of this.

It is an odd thing that even the most scientifically sophisticated society known to history insists on building on faults, floodplains and evanescent beach fronts, and calls the inevitable disasters that occur "acts of God." Thus categorized, these events qualify for emergency aid from the federal bureaucracy, thus in turn pitting the U.S. government against the Lord, which is taking separation of church and state a bit too far. In a zany novel, *Even Cowgirls Get the Blues*, author Tom Robbins describes a group of Indians watching in disbelief from the hills as the white man began rebuilding San Francisco after the 1906 earthquake. "They realized that the white man lacked wisdom, but was he completely goofy?" The answer of course is yes, and that is why American geologists are so hard at work trying to understand earthquakes.

In this endeavor, they have begun to take a hint from the People's Republic of China, whose scientists have taken seriously the folk wisdom that animals sense an oncoming quake. A team from the University of California, Davis, questioned a number of animal owners in the vicinity of a fairly minor earthquake north of San Francisco last year. They discovered that, at least locally, some animals appeared anxious before the quake, though not all. An Arabian horse was found kicking the sides of its stall four hours before the quake occurred, but other horses in adjacent stalls were calm.

According to *Science News* (Vol.113, No. 17), the Davis people aren't so much interested in using animals to get a few hours' lead time, but to find out what they sense so that scientists can measure it.

By no means a problem only in the West, earthquakes are a matter of concern in the East as well. A researcher in South Carolina has found a correlation between earthquakes and slight changes in the Earth's rotation brought about by the tidal forces of the sun and the moon: a 27.5-day cycle (the interval between successive lunar perigees); a 30-day cycle connected to the appearance of "new" moons; the annual cycle; and a nine-year cycle related to the "precession of the lunar-perigee point." He also sees a 90-year cycle in earthquake activity.

While all this may sound a bit like a biorhythm chart on Mother Earth, the South Carolinian puts his figures enough on the line to suggest that if a major quake hits his state in the next decade, it will occur between 1979 and 1983.

Farther north, two Columbia University seismologists are worried about the occurrence of a quake on the Ramapo fault up the Hudson from New York City, near where the local utility has seen fit to build not one but three nuclear power plants.

A fairly severe quake, they say, has a 5 to 11 percent chance of occurring there during the 40-year lifetime of the plants; they thus disagree with the Nuclear Regulatory Commission, which says there's only a 0.5 percent chance, or less. Indeed, the seismologists suggest that an even greater quake has a two percent chance of occurring. Ominously, they suggest in *Science* (Vol. 200, No. 4340) that an individual fault linked to the Ramapo fault system "passes beneath reactor unit 3." The NRC reassures us that the plants are built to withstand such a calamity, but the untutored citizen is tempted to wonder.

—James K. Page jr.

Picture credits

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SIGNS OF LIFE.

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Continued on next page ►

◄ Continued from preceding page

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Showy Lady's-slipper

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Huge new radio telescope array extends Man's celestial vision

Still listening, the ranks of antennas point skyward after a night monitoring the hiss of quasars, the most powerful emitters of radio signals in the universe. Since neither cloud nor sunlight interferes with

On a remote desert in New Mexico, giant ears are listening to signals which may some day tell how universe was created

By John Neary

Photographs by Shorty Wilcox

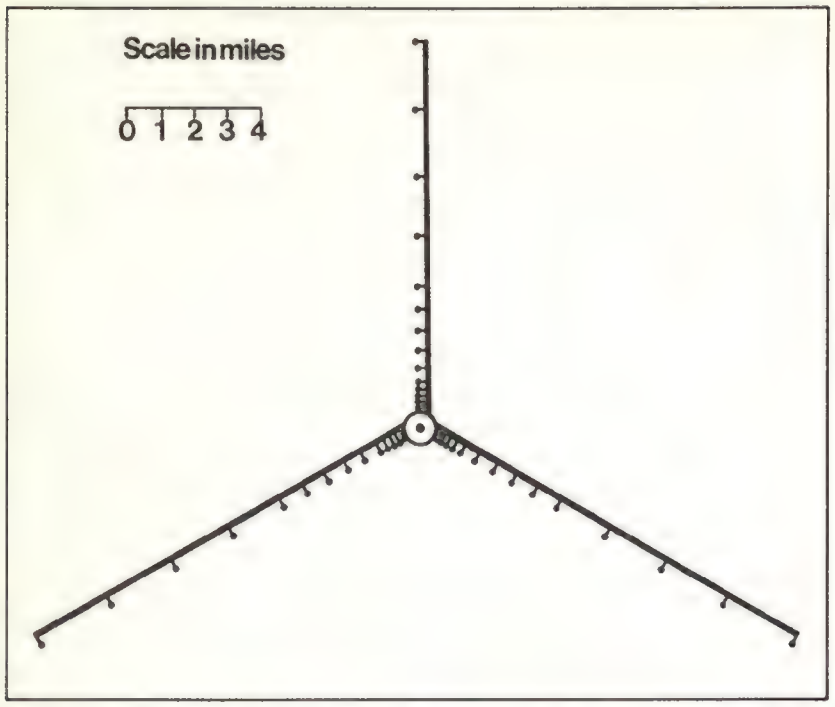
the wavelengths that interest astronomers, observations continue rain or shine, night or day.

Imagine you are Galileo Galilei, and as you assemble what is to be the very first celestial telescope in the history of the world, you savor the prospect of turning the world on its scientific ear. That is precisely how it feels to be one of the scores of men and women at work on the Very Large Array, the biggest, most powerful and most sensitive radio telescope in existence.

This Y-shaped configuration of 27 giant antennas is now taking shape on the vast Plains of San Augustin, 52 miles west of Socorro, New Mexico. Jack Lancaster, Dick Thompson, Barry Clark, Carl Bignell and Bob Hjellming—to name just a few of the people involved in this $78-million project of the National Radio Astronomy Observatory—are as full of pride and enthusiasm as it is possible to be and still maintain a professional cool. The reason: they are convinced that the VLA is going to do for radio astronomy what Galileo's telescope did for optical study of the heavens.

Just as Galileo's refractor gathered more light and magnified the viewing angle more than the best optical instrument then available—which, in the early 17th century, happened to be the human eye—the VLA likewise will be able, by virtue of its huge dimensions and its supersensitive electronics, to gather in more radio waves from outer space, and discriminate among them with greater precision, than any similar device.

Though radio astronomy is still less than 50 years old, its practitioners have already been able to detect objects and discern phenomena which had been unknown—even unimaginable—to their optical brethren. The richness of the data they have accumulated is surprising (see SMITHSONIAN, May 1978 and November 1970), considering the low power of the radio waves themselves. While some celestial bodies function as powerful transmitters, the radio waves they generate are diminished by distance. Indeed, the total energy of all the signals that have struck all the antennas of all



Two arms of VLA are 13 miles long; short arm, which points northward, is 11.8 miles long. Sensitivity and resolving power of the instrument when complete will permit observation of events near time of creation.

Bordered by massive peaks of Continental Divide, a group of antennas is readied for a look

the radio astronomers in the world since 1948, when the science really began to take off, is still equal to no more than the impact of a few snowflakes striking the Earth. Less poetically, what the antennas of radio astronomers pick up when aimed toward even the strongest radio source in space is about one-trillionth of a watt in signal strength, which is infinitesimal compared with even the weakest small-town or "ham" radio station.

Studying such evanescent phenomena may not be as difficult as counting the angels that can dance on the head of a pin, but it approximates the difficulty of, say, weighing them. The job obviously requires some extremely sophisticated and sensitive equipment. Thus it was that while scientists speculated about the existence of radio signals from space as long ago as 1890, when Edison made one of the first ventures to detect solar radio waves, it was not until 1932 that anyone actually found such signals.

The man who heard them—and indeed quite by accident—was Karl G. Jansky, a young Bell Telephone Laboratories engineer investigating the causes of interference in transoceanic radio-telephone communications. In addition to the static produced by such terrestrial sources as lightning flashes and the inner workings of the radio receivers themselves, Jansky kept picking up a persistent hissing. It varied in strength, depending on the time of day—and depending on where in the sky he aimed his antenna. Only after months of listening did Jansky realize that he must have tuned in on the world's oldest radio show: the sibilant electronic utterance of the very heart of the Milky Way Galaxy.

Jansky did not know why the galaxy was making this racket, but we know now that every particle of matter in the universe radiates highly energetic electrons at radio frequencies. These emissions result from the inevitable spin-flips and collisions of the electrons composing the material in question—whether a jar of peanut butter or a collection of stars. The electron of a hydrogen atom, for example, spontaneously changes its orbital direction on the average of once every 11 million years. This reversal causes an energy loss, detectable on Earth—if the hydrogen exists in the form of a nebula in space—at the 21.3 centimeter wavelength. Such a reversal can be induced to occur more frequently, however, when one hydrogen atom bumps into another and *knocks* the electron into reverse—something a hydrogen atom can expect to experience once every 400 years.

Now it happens that space is almost entirely empty, but not quite. The air we breathe contains about 10-to-the-19th-power molecules in each cubic centimeter;

at a distant nebula. The full collection of dishes functions as single antenna 17 miles across.

Transporter shifts 213-ton dishes around like chessmen along some 38 miles of double-gauge tracks.

a cloud of hydrogen in space, on the other hand, contains only about 10 to 100 atoms—not molecules, but atoms—per cubic centimeter. However, space is enormous: a cloud of hydrogen can be ten light-years deep, meaning that each square-centimeter cross section would contain at least 10-to-the-20th-power atoms of hydrogen. Of them, some 10-to-the-10th-power atoms would undergo electron reversal at any given second. Taken altogether, the reversing electrons would produce a radio signal strong enough to be detected thousands of light-years away.

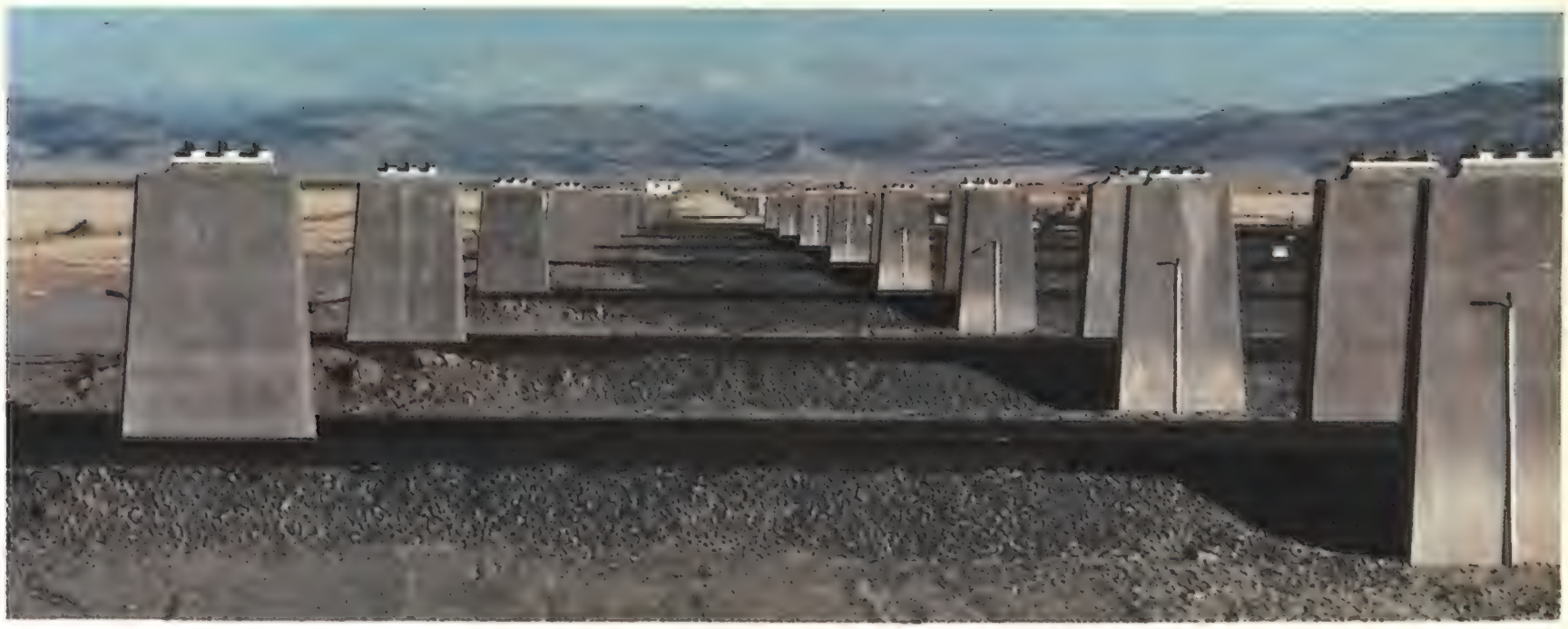
There are other kinds of electronic acrobatics going on in space that produce radio signals; the trick is to distinguish the signal, whatever its origin, from the noise the receiver itself makes. This the radio astronomer does by carefully matching his equipment's customary level of internal noise with the electronic blip he gets when he sweeps his antenna across the sky (or when the sky itself sweeps past a stationary antenna). The radio astronomer is not really listening to the sounds produced by his receiver; they are no more interesting than the hiss you pick up when you tune your stereo receiver to a spot between stations. Instead, he is interested in the power, frequency, wavelength, phase and polarization of the signals. Computers keep track of such data, as well as noting the time of day and where the radio telescope was aimed when it detected a given signal.

With a radio telescope of sufficient discrimination, the radio astronomer can then proceed to make maps of his sources, identifying them by signal strength or other characteristics.

Why radio telescopes? Because many of the things astronomers want to study in space simply cannot be examined optically. Dust and cosmic debris ofttimes restrict their vision in and around the spiral arms of our galaxy, and the nucleus is obscured by the blinding light of billions of stars. Radio waves at the longer wavelengths are not impeded by rain, snow, fog, sunlight or atmospheric turbulence. Then, too, some ob-

John Neary is a free-lance writer who now lives in Tesuque, New Mexico. His recent book, Whom the Gods Destroy, *is about madness.*

Standing inside the dish, deputy program manager Thompson and Vic Herrero, systems engineer, examine receiving apparatus. Here beams are focused, then amplified and transmitted to the computers.



When complete, 72 observing platforms will give astronomers a gourmet's choice of 351 combinations of dishes. Targets will vary widely in size, distance, composition and in signal frequency and wavelength.

jects, like "pulsating" collapsed stars (pulsars) and vast bodies of interstellar gas and organic molecules, radiate intensely only in the nonvisual parts of the spectrum. Radio telescopy will also have much to tell us about how quasars manage to generate their energy. These "quasi-stellar radio sources" produce enormous amounts of energy, as though all of the 250 billion stars in the Milky Way had been jammed into one fireball just a few light-years in diameter.

Despite all these advances, the limitations of radio telescopes have exasperated astronomers. Compared to the images obtainable from, say, the "Big Eye"—the 200-inch optical telescope on Mt. Palomar in California—the "pictures" from the best existing radio telescope look as if they were taken through the bottom of a pop bottle. As Thompson, VLA deputy program manager, says, "If you are using an optical telescope, the finest angular detail you can see is inversely proportional to the diameter of the mirror divided by the wavelength of light. The same thing is true of radio waves, which are several centimeters long—a hundred thousand times longer than waves of optical light. If you want comparable angular detail, you need a mirror a hundred thousand times wider than its optical counterpart. Physically, you couldn't construct a single telescope of such dimensions, but you can build a number of smaller ones and combine the signals."

This is precisely what the National Radio Astronomy Observatory, operated by the consortium of Associated Universities, Inc., for the National Science Foundation, is doing near Socorro. This broad, flat valley, once a Pleistocene lake bed, consists of at least half a million acres of ranch land, of which 3,500 acres will be used by the VLA. The location was chosen for a number of reasons, but above all the high altitude, which offers minimal atmospheric interference and relative freedom from hurricanes or tornadoes; the southerly latitude, which provides increased sky coverage, particularly of the Milky Way's galactic center; and the remoteness from man-made radiation.

The VLA looks nothing like any popular notion of a telescope as you come upon it after driving through the Magdalena Mountains from town. In fact, an inquiry about the telescope itself is apt to draw a blank stare from the locals. But everybody seems to know about those big, gleaming white antennas—"You'll see 'em miles away!" Indeed you will, still diminutive on the horizon, like some Erector dream set made to order for a millionaire model buff. Then, as you draw nearer, the antennas loom larger on the sweep of the plains until they dwarf other structures—a cattle farmer's windmill and barn, and the VLA operations facilities.

The two-story control building, flanked by a cafeteria and a dormitory for visiting sky-gazers, is as nononsense inside as a police barracks. Already, although the VLA will not be finished until January 1981, the place is humming with scientists, engineers and technicians testing and calibrating their new baby.

One morning not very long ago, when the Magdalenas were shrouded in a mist of rain and fog, the VLA was busy scanning the surface of the sun. A 29-year-old array operator, Linda Sowinski, took us out to meet the newest of the huge antennas, Number 11, still undergoing an electronics shakedown. We wore hardhats, and climbing the 50 or 60 feet of open metal stairs to the "vertex room" was a somewhat dizzying experience. There was a pulsing sound in the vertex,

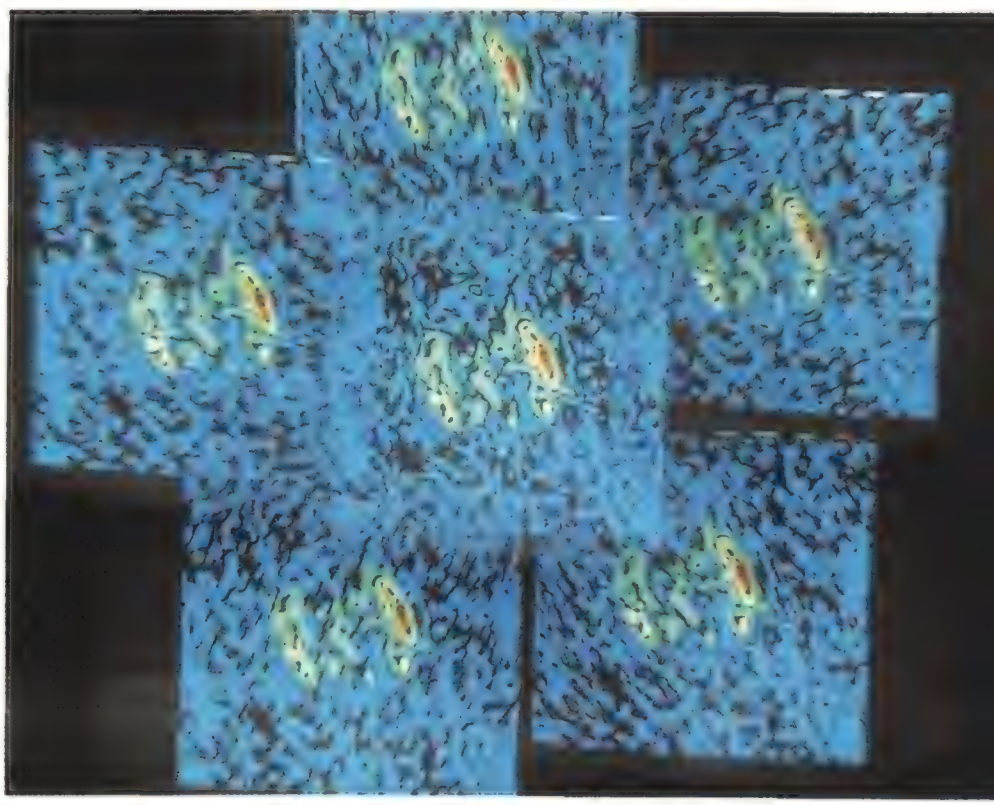
the sound of the cryogenic pumps that keep a crucial portion of Number 11's electronics cooled to a frosty -427 degrees F. Alarm buttons were situated here and there around the structure—so that anyone on board when the big antenna begins to tip can let the operator know someone's there.

While the length of the radio waves studied means that individual dish-shaped "mirrors" do not have to be nearly so flawlessly smooth as an optical telescope's, the VLA has posed a substantial construction challenge. Two of its arms are 13 miles long; the third is 11.8 miles. The 213-ton aluminum ears—each 82 feet wide—must be movable and steerable, yet capable of performing in winds up to 40 mph and withstanding gusts of 125 mph at snow loads of 202 pounds per square yard. The Earth spins the installation in an arc beneath the heavens like a turntable, eventually moving the object of study beyond the field of view, but while it is in sight, refined electronic circuitry must keep the antennas locked on target and operating in unison. Some 85 percent of the celestial hemisphere, the sky over a given point on the Earth's surface, is accessible at any moment.

For a change of focus, the antennas (11 of the 27 are currently in operation, providing astronomers limited use of the facility) can be lifted from their pillars and moved by a 24-wheel, 60-ton transporter (p. 31) at up to five mph along a double pair of railroad tracks to any of 72 observing stations. At present, 55 of them are in place. There will be four basic configurations, approximately 13, 4, 1.2 and 0.37 miles long. Extended to its fullest, the array will see only the smallest objects and will be able to distinguish among components of radio sources no farther apart than 1/10 of a second of arc. When the antennas are clustered into their closest formation, the VLA will lose some of its resolving power—its capacity to separate one source of light from another—but its sensitivity to continuous emissions of a given object will be greater.

Radio waves bounce off the concave surface of each antenna and strike a subreflector, which directs them to one of four sets of receivers, amplifiers and signal processors. Then they are picked up and transmitted to the central control building, where signals from all the antennas are combined and sent to the VLA's cerebral cortex, a battery of computers. The signals are carried not by ordinary electrical cable, but via waveguide; the waveguide is a buried copper-lined steel pipe 60 millimeters in diameter designed to handle 600,000 telephone calls at a time, and has the principal virtue of transmitting tremendous amounts of data without loss in signal strength. By matching up incoming data from pairs of antennas, 351 different pair-combinations can be set up.

"Billions of bits of information are coming in every hour," says the program director, Lancaster, and that is obviously beyond the capacity of any mortal arithmetician to manage. While an operator is in constant attendance, the job of running the VLA is given over to four minicomputer units which chat back and forth via teleprinter as they order the 'scopes around and sift through the masses of accumulated data. "Boss" oversees the two workhorses of the crew—"Cora," which collects the billions of signals, and "Corbin," which performs the staggering task of correlating it all—while "Monty," the fourth one, mon-



Computer data from VLA can be displayed visually in a variety of forms, such as the multiple-image map shown above. At right, programmer Jim Torson looks at high-resolution picture of distant sources.

itors all performances, including its own, instantaneously and with tireless vigilance.

The end product of all these labors is a curious mathematical map: a scroll of paper solidly covered with numbers, each representing the signal strength of an area just a few tenths of a second of arc in diameter. At the vast distances involved, this means the VLA is examining—in the case of the nearest spiral galaxy, the Andromeda Nebula—a location many hundreds of light-years wide, but still a pinpoint by astronomical standards. "We can make maps with four million numbers on them," says British-born astronomer Thompson. The computers will also conjure up a gaudy color video image of the radio source being studied, which the astronomers can then record with an instant camera for later reference. By virtue of the VLA's projected ability to detect the characteristic frequencies of key elements and molecules in space, the staff will eventually be able to map them as well.

The VLA is far more sensitive and easier to use than any other installation of its kind. It is instrumented so that an observer can switch among four different frequencies in about 60 seconds instead of having to make awkward, time-consuming changes in equipment. Early in December 1976, a month after formal program observations began, spectra from a celestial x-ray source were obtained in a few hours; heretofore, such observations might have taken months or years. Since there are always more astronomers with critical projects in mind than there is observing time on existing instruments, such celerity is highly desirable and long overdue.

Indeed, few aspects of astronomy will be untouched by this splendid new instrument. Astronomers have been wondering for some time whether there is an active center in our galaxy which expels gas and produces a high flux of energy in various parts of the electromagnetic spectrum. The galactic nucleus lies in the direction of the constellation Sagittarius, and is invisible in ordinary light because thick clouds of interstellar dust get in the way. Radio waves, however, penetrate the dust easily. They reveal a radio source buried in the complex of clouds called Sagittarius A, and though that area does not appear as bright as the centers of other galaxies, it does still exhibit a rapid outflow of gaseous material. Thus it appears that the nucleus of the Milky Way Galaxy was once like the most active ones we see elsewhere.

The new facility has attracted many talented staff and visiting astronomers from all over the United States and the world. Scientist Bignell, a 34-year-old Canadian, moved himself and his family from the NRAO headquarters in Charlottesville, Virginia, to Socorro. To Bignell, the VLA "allows us to probe beyond our own Earth, to understand—in a very esoteric way—what's happening in the universe." Bignell and his colleagues are chasing some very big cosmological questions: How did the universe originate? What is its

structure? Is it positively or negatively curved? Will it collapse some day or go on expanding forever, or does it pulsate on a time scale of tens of billions of years? When these astronomers predict the VLA may see to the very limits of the universe, the mind does boggle a bit, because the notion seems to contradict the very meaning of the term universe. What lies beyond those limits? Is there anyone who understands these contradictions? "I don't know anybody who does, but there can only be one universe as far as we physically are concerned," Bignell replies. "There is no window to the other side."

The man in the street might well ask what this has to do with him. The answer is—maybe everything. Among various molecules found in interstellar gas clouds is some complex organic material, and astronomers hope that they will even find amino acids, the basic building blocks of life. Finding them would be of major philosophical as well as scientific importance because, according to theory, interstellar gas clouds now and then condense into stars and their associated planets. The Earth itself is supposed to have resulted from such a condensation and so may have been endowed at birth with the materials from which life evolved. The organic compounds in the nuclei of your cells and mine may have been made in interstellar space five billion years ago.

Then there are the mysterious quasars, some of which appear to be flying apart at speeds greater than light. Since physics is based on the postulate that nothing can go faster than light, the experts are scrambling for ways to explain these apparent hyperluminal velocities. Hjellming, an NRAO senior staff scientist who is with the VLA, says that if it could be established that "some things *do* move faster than the speed of light, there is possibly no more revolutionary finding we could come up with." Of course, he quickly adds, the phenomenon may be nothing more than an optical illusion of sorts. Unaccountably, too, as we have seen, quasars radiate as much light and as many radio waves as entire galaxies. According to Hjellming, they would have to convert up to 20 to 25 percent of their mass into energy in order to produce the findings obtained by the VLA—yet the most efficient fusion process known would yield a mass conversion ratio of only 10 to 15 percent. Proof that quasars do immolate themselves in this way, and that the readings are not simply being misunderstood, would require profound modifications of physical law. The prospect doesn't bother him.

"Physics," says Hjellming, "has been thoroughly dull for the last 10, 15 years. We've proved quarks exist, and found a few more particles, and that's about all." The VLA, he believes, will agitate his profession considerably. "The astronomical laboratory is the best place to find things we don't expect. The reason I'm an astronomer is that the most interesting unsolved problems—pulsars, quasars, black holes, the geometry of space—lie in this natural realm and it's cheaper to examine them in this laboratory." Indeed, no physicist can produce comparable effects on Earth.

"But nature has no problem producing such things and on a galactic scale," Hjellming explains. "If we can find out how nature does it, it would be fantastic. When one is in one's cups, one says one is working on the energy problem."

Hjellming ruminated on yet more riddles the VLA might help astrophysicists to solve. Because quasars are so many billions of light-years away—and that means so many billions of years back in time—they could tell us a great deal about physical conditions at the birth of the universe. "To be able to see out as far as one can see anything! To turn the cosmological clock back!" He believes that if we can say anything about how quasars age, we can say what the universe was really like and how it evolved. "The ultimate would be to find some cut-off. No more stars, no galaxies, *nothing*. At that point, we would be studying objects closer to T-equals-zero than anything around."

T-equals-zero: the birth date of the universe, when all the stuff that would make up everything from the tiniest meson to Man himself was first created. "One has an urge to try to overthrow laws," he admits as he chalks complex diagrams on the blackboard of his Socorro study. "That's the reason we are in this business. We will find things going on that we never even guessed." In short, things beyond imagination.

Earth's rotation causes star streaks in this time exposure. Red lights alert low-flying aircraft.

By Robert A. Jones

After a long and bitter battle, a clear victory for the redwoods

Expansion plan for the national park will both protect the forest and create new jobs for former loggers—but at a cost

First, you have to find it. Redwood National Park is not hidden, exactly, but at that point in northern California where the cool, foggy reaches of U.S. 101 pass the road in to the park, there is no sign marking its existence. There is a sign up the entrance road, but a traveler on 101 could slip by, roll northward, and never know he had missed the most expensive national park in the world.

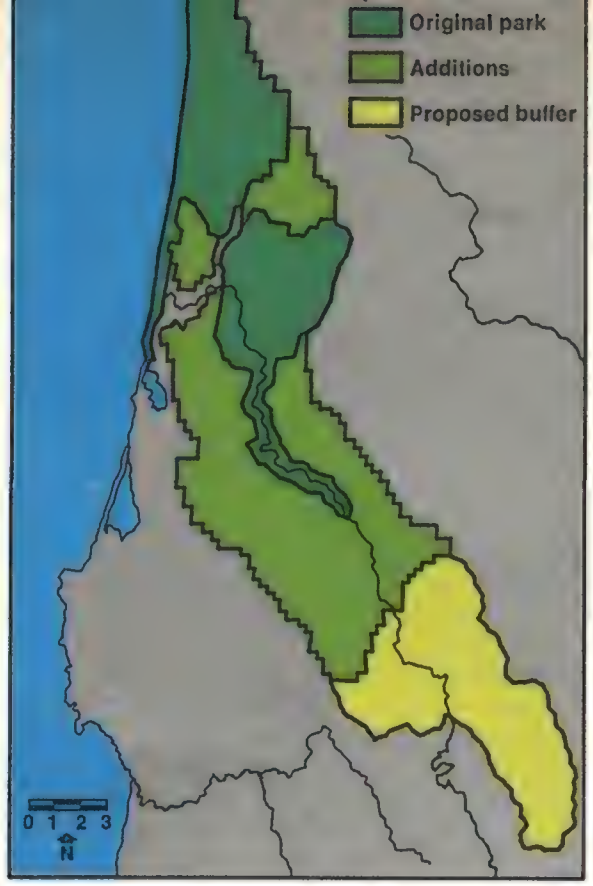
To begin with, lack of the sign seems a great oversight. Could anyone similarly miss Yellowstone or the Great Smoky Mountains? Could the National Park Service, which has spent $92 million for this park and will probably spend half a billion more, have forgotten to put up a sign? But this is the redwoods, not Yellowstone, and the first questions are not always the right ones. Eventually, you come to understand.

I first saw the park in 1969, just months after it had been created by Congress. It was winter but a bright, crystalline day nonetheless, and I stopped the car along a small road that runs down the crest of Redwood Creek watershed. A logging company forester pulled alongside and for a moment we shared the rare scene before us, a winter day flooded in brilliant sunshine. The slopes swept downward a thousand feet toward the creek. They were unbroken; ridge upon ridge

The expanded park will include logged-over areas like this. But, given time, the forest will regenerate.

In front of a mill-bound redwood, Eureka mayor Sam Sacco listens sympathetically to disgruntled loggers.

An Arcata official, Lowell Chapman, displays redwood seedlings used to reforest the slopes after logging.



The map shows the old and new boundaries. Park lies some 350 miles north of San Francisco.

Conservationist John Amodio now beams with victory, but recalls: "Anger was the fuel that drove us."

of sage-green hills falling back into a smoky haze.

Since there were no signs at all then, I asked the forester: was this the new national park? "Well, yes," he said, pointing down the creek. "It runs along there, about one-third the way up each slope." He paused and then said, "The rest is ours."

So it was. And for ten years, that was the problem with Redwood National Park. The view that I shared with the forester became a crazy patchwork of clear-cuts, many of them stopping only at that invisible line dividing the park from land dedicated to industrial forestry. Loggers cut their way down the watershed, so that now, as you look southward, the whole thing looks like missing teeth in a crooked smile.

Those ten years produced one of the most bitter controversies in the history of environmental politics. Now, when most of the trees in Redwood Creek basin have been cut down and carted off for den paneling, shingles and backyard decks, Redwood National Park has been expanded. The park will grow from 28,000 to 76,000 acres, and in a hundred years the slopes will look something like they did ten years ago.

It is one measure of the length and difficulty of the park issue that almost no one here can now remember its origins. As far as anyone can tell, it began in 1918 with a proposal by the Save-the-Redwoods League to create a national park there. The idea was hated then by loggers and blue-collar workers along the north coast just as it is hated now, and it was not until 1968 that Congress established the park just east of the town of Orick. The product of zealous compromise by Congress, the original park takes the shape of a gigantic tadpole, with the tail of the tadpole running along either side of Redwood Creek. The tail section is known, ignominiously, as "the worm."

The shape is nothing short of a classic gerrymander, designed to appease both conservation groups and the logging industry. The park—supposedly a place offering visitors solace and beauty—was squeezed between enormous tracts of commercial timberland. The dangers were obvious and the results not long in coming.

The coastal redwoods *(Sequoia sempervirens),* as almost everyone knows, are the tallest trees in the world. The tallest on record, at 367.8 feet, has grown for approximately 600 years (others date back some 2,000 years) on an alluvial terrace at the side of Redwood Creek. The question of this tree's right to the title is the subject of an extended debate in north-coast bars. Occasionally a logger will claim to know of one or several other trees that reach skyward even higher. But usually the stories are told in a special form. The logger first describes the tree and then relates the exact number of minutes it took his crew to cut it down. In Eureka or Crescent City, this kind of story usually gets the logger a free drink.

Though not the largest trees—that honor goes to a near relative, the sequoia *(Sequoiadendron giganteum),* which lives in the inland mountains and measures as much as 30 feet in diameter—virgin coastal redwoods may reach 20 feet in diameter, and a grove of these trees leaves visitors with impressions and feelings that are unique in the natural world. They are beautiful, cool and quiet. Far above, the foliage canopy lends a green translucence and bathes everything in an aquamarine haze. The forest floor is padded, almost spongy, with the accumulation of years of

soft needles and branches. There are huge, dripping ferns, huckleberry, rhododendrons, oxalis and lilies. It is a scene so lovely and so old that it tends to diminish Man, and there are those who leave such groves feeling frightened.

And cutting such trees down is not easy. They are so large that only the most mammoth machinery can move them around. They are so tall that they tend to splinter when crashing to the ground, requiring huge, cushioning "layouts" to be scraped into the earth by bulldozers. The profit from harvesting these trees, of course, is commensurate with the difficulty; one acre of prime old growth can be worth more than $80,000 while still on the stump.

Such groves are usually harvested with the aid of squadrons of bulldozers. The condition of the landscape after a section of old-growth redwood has been removed is referred to in forestry parlance as "disturbed." Trenches have been cut into the ground; slash, wood debris of every sort, sections of discarded cable, machinery parts lie scattered about. To those new to industrial forestry, this scene is invariably sobering. There is a sense roughly equivalent to that of coming upon the crash of an airliner only minutes after the bodies have been carried away.

In many cases, the horror of a clear-cut is more apparent than real. Redwoods regenerate with speedy determination and in ten years a cut area, if on level ground with otherwise favorable growing conditions, will be sprouting another fledgling grove (though from seed to maturity requires as much as a century).

But in the basin of Redwood Creek there is very little level ground. The slopes of the watershed are relatively steep for the harvesting of large trees. And in a normal winter they receive some of the heaviest rainfall in North America. The result is erosion. The rains wash over the bare ground, first picking up minute particles but eventually gathering momentum and carrying along gravel, topsoil, wood slash and even whole tree stumps.

This has happened for many years along the north coast. But in 1968 it began happening near the new national park, and conservationists grew alarmed. As cuts were made at the borders of the park, trees inside the park were exposed to winds that can reach ferocious levels during winter storms. Redwoods, without a deep root system, were vulnerable to windthrow. And finally, the gradual buildup of gravel and other erosion debris in Redwood Creek deflected the stream itself, directing the current against the flat alluvial banks. Those banks contained some of the

Robert Jones, a writer for the Los Angeles Times, *reports frequently on environmental matters and has closely observed the redwoods controversy.*

In Jedediah Smith State Park, south of national park, workers fell a redwood killed by chain-saw vandals. Some conservationists accused loggers—and vice versa.

Erosion and debris caused by logging have shifted the channel of Redwood Creek, deflecting it against its banks and thereby threatening choice groves.

Lumber from redwoods is in great demand because of its straight grain, durability, attractive color.

finest old groves, and their loss would be grave indeed.

Rudolf Becking, a professor at nearby Humboldt State University, and some of his students began making forays into the region of the park and its surrounding lands. They watched the harvesting come closer to the park; they saw previously virgin regions transformed to post-harvest moonscapes.

One of Becking's students was John Amodio. Small, Italian, an outlander from New Jersey, Amodio was about to become a principal in the struggle that had begun before he was born. Shrewd, cynical, able to retain his poise and humor before a large crowd, Amodio first joined and soon began to lead a group called the Emerald Creek Committee. Mostly they were students from the college and mostly they knew nothing of how to bring about political change.

They did know they were angry. "The worst part was when you came to a clear-cut that you had seen a couple months before when it was intact," Amodio says. "You'd get sick, physically sick. Some people, that kind of thing would crush them and they'd drop out. But others of us, it fired us up. It drove us."

In 1973 the Emerald Creek Committee, with support from the Sierra Club and other environmental organizations, demanded of the state's Forestry Board that logging operations be improved. At that point the board was composed largely of aging ranchers, fruit growers and loggers who had little time for the ragged bunch of malcontents. Month after month Amodio and others would appear with their latest list of protests; they would drone on through the long warm afternoons. Afterward, the Board would vote down whatever request the conservationists had made.

"How can you call this a national park?"

At the park itself, few people actually visited the choicest groves, perhaps because there were then few signs directing them or perhaps, as the timber companies have often argued, because most people would rather see the redwoods from the inside of a car. At the national park you had to get out and walk—eight miles to the tallest trees.

And if the Park Service ever was guilty of underpromoting one of its natural wonders, it was here. There were no entrance stations, no interpretive centers, no master plan and usually no rangers in sight. Each year only a few thousand visitors walked down the Redwood Creek trail to see the "tall trees," as a particular grove of giants is called. But those who did left their impressions at the trail register. They told of afternoons spent under the howl of chain saws and bulldozers. "How can you call this a national park?" one wrote. "I don't know who makes me the angriest, the Park Service or the loggers."

There are only a few signs marking park's existence—this one on an entrance road stands next to sawmill.

The controversy simmered for years. The Sierra Club sued the Interior Department to force the Park Service to protect the redwoods. The Park Service commissioned studies to find out if the logging was causing erosion damage, and then, when the damage was confirmed, the state of California commissioned another report to figure out what to do about it. The redwoods were like that; they sucked down studies by the trolley-car load.

At one point in the struggle, Representative Phillip Burton of San Francisco submitted a bill to expand the park. The bill went nowhere in Congress, but it did create something else—a general uprising in Eureka, Crescent City and the small logging towns of the north coast.

The original park bill had taken a substantial amount of land out of production, inevitably costing jobs. And along the north coast, a job is a precious commodity. Three timber companies—Arcata, Louisiana Pacific and Simpson—provide much of the employment in the region. In Humboldt County, where most of the park is located, the unemployment rate is 15 percent and climbing. In an expanded park, depending on whose study one believes, anywhere from 920 to 1,660 jobs will disappear.

One of the loggers' staunchest champions has been Sam Sacco, the mayor of Eureka (p. 38). A huge man who moves about his office like a zeppelin in search of a mooring spot, Sacco hates the park, all it stands for, and rails against anyone of different mind. The park, he says, is strangling the workingman in his region. "If the people want redwood parks, they got redwood parks already. We got state parks, we got county parks. A lotta time you go out there and nobody at all is using those parks. You know what it is? It's a bunch of loud preservationists—there's only about 50 of them—and they're the ones who've forced this. They want to reverse time. They want the buffalo to run again.

"Has anybody thought about what this [the national park] is going to do up here?" Sacco leans over and pounds a meaty fist on his desk. "We're not animals. We're not monsters. We're people and this is still America. We have a right to our destiny."

In 1975 the loggers, cat skinners, truck drivers and millworkers began to fight back. In Eureka they staged massive demonstrations. When Burton's subcommittee came to town for a field hearing, they emptied the town's shops and homes, filling the streets with thousands of angry citizens. Led by Sacco, they marched to the hearing and hooted down Burton and anyone who spoke favorably of the plan.

One conservation leader recalls a public hearing on the park that was jammed with more than 2,000 screaming, stomping citizens of the north coast. The crowd, more or less ignoring the hearing, vented their anger on the dozen conservationists present. One group of loggers milled about in the aisles, blocking the path of the park supporters, sometimes shouting into their faces, sometimes poking fingers into their chests. "It was designed to intimidate and I guess it worked," says the conservationist.

A redwood peanut goes to Washington

In a late stage of the dispute, a number of logging trucks roared out of town with air horns blowing to carry the protest to Washington. One truck carried a redwood carved in the shape of a peanut for presentation to the President.

At the park's headquarters in Crescent City, superintendent George Von der Lippe grew concerned as vandals began to destroy trees by raking them with chain saws. Although the trees were located in state parks, Von der Lippe nonetheless recognized the vulnerability of the tall trees grove inside the national park. And so for weeks rangers regularly patrolled the grove, listening for the whine of saws. "There were no threats, but at the same time we knew that Congress was about to act," he said. "The feelings were running high against the park up here, and we wanted to be careful." And so it had come to that: rangers perhaps defending the park against the local population.

But for all the activity, the demonstrations, the truck convoys, it was too late. The idea of an expanded park had acquired too much momentum. In Congress the old order was changing, and John Amodio suddenly found himself flying to Washington to testify before Congress and then to New York for appearances on "Good Morning America." In Sacramento a new and livelier Forestry Board passed a partial moratorium on logging around the park and the Park Service began to speak publicly of damage from logging. And the new administration committed itself

to an expanded park. Late last winter, a compromise version of Burton's bill became law.

Thus, after ten years, Redwood National Park was expanded toward what probably should have been created in the first place. The new park will cover both ridges and include the slopes immediately behind the town of Orick and the watershed of Skunk Cabbage Creek. Additionally, the Secretary of the Interior is authorized to acquire 30,000 more acres if erosion from upstream continues to damage the park. This land, however, contains very few redwoods; it would be purchased only to provide an additional buffer for the park.

The cost will be high. Lumber company officials openly scoff at the $359 million figure used by the Park Service as a maximum for land purchase. Several lumber officials estimate that the total may be double that figure, and in the past their numbers have been closer to the final price than the government's.

But if the loggers did not stop the park's enlargement, they did win an unprecedented jobs program to provide employment for those affected by the loss of timberland. The administration has pledged funds from existing programs to help north coast workers. And the expansion bill itself creates a $33-million project to restore areas damaged by timber harvesting. Such a project will provide about 900 new jobs, the government estimates, many of them closely resembling the timber industry jobs lost to the park.

For older workers there are also fallback financial benefits that include income maintenance payments, job training and even relocation funds. The total benefits are broad-ranged and so expensive that President Carter expressed reservation about the jobs package when he signed the park expansion bill. Fearing for other park legislation, the President said workers in other areas may now demand similar treatment.

But for union officials along the north coast, the jobs package amounts to a reprieve from the slow economic strangulation that has gripped this area for more than a decade. "We've got to accept the situation," says Al Lasley, secretary of the Lumber and Sawmill Workers Local 2592 in Eureka. "The battle is over and we lost. Jobs are going to be scarcer and scarcer in the timber industry and we have to try and attract other kinds of business here. We have natural resources here for many industries. This region has been like a company town for too long."

As for the companies themselves, they will be paid for the land they lose to the park. "Our real problem right now is land to grow redwoods for the next few decades," says Lowell Chapman, soft-spoken vice president of Arcata Redwood Company. "Good redwood acreage can grow 1,500 board feet a year. If you figure we have now lost 76,000 acres to the park, it comes out to 114 million board feet a year. We're going to have to make that up somewhere."

And how much park will the country get for its money? In the beginning, very little. For years, the cutover slopes of Redwood Creek will continue to bleed their soil into the streams of the basin. The tall trees grove—the focus of so much attention in the expansion debate—will continue to be threatened as accumulated gravels in Redwood Creek wash through the basin. About 12,000 acres of the new park land is virgin forest and meadow. The rest is nightmarish, a land of tree stumps and snags, deep gashes cut by bulldozers, and stream beds filled with decaying debris. Edgar Wayburn, past president of the Sierra Club, calls the addition a "park of the future," and it is that. The future may be a century in coming.

Even when it comes, Redwood National Park will never enjoy the popularity of Yosemite or Yellowstone. The bottomlands are too cool, even in the summer, and the region too lacking in the spectacular scenery of other Western parks. But thousands will come, and they will find an entire, maturing redwood forest that runs as far as a person can see. For those people, in the year 2050 or 2075, today's high price tag most probably will seem cheap indeed.

And is it over? The environmentalists say it is. Some loggers say they'll continue to fight. Von der Lippe says it must end. The emotional cost has been too high already, he says, and the energy now must be directed toward building the redwoods into a real park. The Park Service has great plans, he says, "and right now it looks real good. Real good."

Within a grove, sunlight bursts into a kaleidoscopic pattern. Such scenes will be more common in future.

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By Joshua Taylor

National Collection and its wandering over 149-year span

American art treasures had to room out for a long time, but now celebrate tenth anniversary in their own grand home

Today, when one enters the spacious halls of the Smithsonian's National Collection of Fine Arts in the venerable, totally restored building dedicated just ten years ago by President Lyndon B. Johnson, it is easy to forget the long and trying history of the collection through the 149 years since a determined man named John Varden first announced his idea for a national museum. In fact, the stately building—which escaped demolition in the 1950s to make way for a parking facility—gave the National Collection its long-awaited chance to take on new life as well as a new identity.

Building on the substantial nucleus of its American holdings, the NCFA (designation by its initials is an inheritance from the alphabetism of the 1930s) has become a center for the study and encouragement of American art. Although it retains (and maintains) its inherited collection from around the world, expansion has been focused wholly on the arts of the United States. The number of works in the NCFA has almost doubled in ten years, and its activities have multiplied. But that is the nature of the modern museum. John Varden, waiting for the public in his 30-foot room

In borrowed quarters in the Natural History Building, William Henry Holmes, first director of the then National Gallery of Art, now the National Collection of Fine Arts, poses about 1925 with staff of three.

Today's staff: custodians of the nation's official arts collection in front of its noble residence.

Director Taylor is at extreme left, front row; assistant director Harry Lowe is at extreme right.

Pictures topping these pages record moves of G.P.A. Healy's 1841 portrait of French foreign minister Guizot, beginning, at left, over century ago in the Great Hall of Smithsonian castle. Above, about 1879,

filled with miscellaneous wonders, seems remote in every way from the present museum of some 80,000 square feet of gallery space designed to show off each work of art to its best advantage. Furthermore, the galleries are backed up by educational programs that set out to meet the public of all ages, and by research activities that link the museum to universities and provide for an active program of publication. More than 200 people are busily engaged in public programs, conservation, research, exhibition design, packing and shipping the many works borrowed and lent, and performing all the other tasks that make a museum a place of excitement rather than somnolence.

Exasperated by the fact that the nation's capital had not yet, by 1829, been able to boast of a permanent national museum, John Varden decided in that year to found one himself. So he built a 30-foot room for the purpose, solicited contributions of works from his friends, and by 1836 proudly announced that his Washington Museum was open to the public.

His idea of what a museum should be and should do bore, to be sure, little resemblance to what such institutions have become in recent years. Still, the imposing museums that have now burgeoned in Washington should look back to their modest progenitor with gratitude: he had the audacity to take the first step.

Among the "400 or 500 specimens" that Varden collected (Indian relics, objects of historical and scientific interest, and so on), were some 40 works of art, and with them—quite consciously, one might hope—he laid the foundation for the first national art gallery. At least two of the paintings he acquired, which were in wretched enough condition to be considered works by Old Masters (p. 52), somehow have survived the wan-

The artist of this panoramic, romantic 18th-century *View of Constantinople from Pera,* is unknown.

as shown in Corcoran's first building, now the Renwick Gallery. In about 1925, as it was installed, above, in

borrowed gallery in Natural History Museum, and as it hangs today at National Collection of Fine Arts.

derings and vicissitudes that would plague the national art collection for more than a century and are preserved today in the NCFA.

There, still showing the ravages of time, they have recently gone on display as ghostly forefathers in an exhibition that examines the past and present as embodied in the ranging collection and multifarious activity of the present National Collection. The comprehensive survey, titled "Past and Present: A Century and A Half of A National Collection," will be on view through September 4.

The year that John Varden opened his museum to the public—the inauguration was on June 1, 1836—a large and impressive building was begun a few blocks away to provide a palatial home for the U.S. Patent Office. This monument to American ingenuity, which enjoyed rather more prestige than American art, was designed by William Parker Elliot with extensive third-floor galleries, ostensibly for the display of patent models. By 1841, however, the great vaulted space of the completed portion of the building on F Street had been taken over largely by the National Institution for the Promotion of Science (later the National Institute). This was a quasi-official organization headed by the Secretary of War, Joel R. Poinsett; it hoped to benefit from the recent bequest of James Smithson, about which Congress was still debating. There, among paintings of Indians provided by the War Department, portraits of statesmen and ethnographic and geological specimens, Varden's collection was established in a more elegant setting than he himself had been able to provide. Along with his possessions went John Varden himself, to help take care of what became known in the 1850s as the National Gallery.

Measuring 25 by 112 inches, it was purchased in Rome from the collection of Cardinal Fesch in 1840s.

Paintings and sculpture began to accumulate from various sources. In 1841 a group of Americans in Paris commissioned G.P.A. Healy to paint the French foreign minister, François Guizot (pp. 50-51), who had endeared himself to Americans by translating into French the life and letters of George Washington. President Tyler sent the painting to the Institute for exhibition, and Healy was promptly commissioned to paint several other portraits, including one of President Tyler himself. Thomas Halsey sent from Europe a large view of a procession before Constantinople (pp. 50-51), which he had bought at the sale of the Cardinal Fesch collection in Rome; and Dr. Robert W. Gibbes of South Carolina presented a painting of *Job and His Comforters,* attributed to the Italian painter Luca Giordano. Many collectors lent paintings to fill the walls. By 1857 the works of art and other exhibitions had increased to the point that supporters of the Patent Office were complaining that there was no room left for the patent models.

In the meantime, another distinguished building had made its appearance in Washington, more picturesque in its castellated outlines than the austere Patent Office. This was James Renwick's red sandstone edifice (now known as the "castle") for the Smithsonian Institution, which finally had been established, after much debate, as the recipient of Smithson's bequest. To its Norman-Romanesque halls the collection began to migrate in 1857. And there to receive it was, once again, the industrious John Varden, now moved across the Mall. He recorded in his diary the day-to-day activity of hanging the pictures and arranging the busts. It took two days to maneuver the stately portrait of Guizot into its position overlooking rows of Indian portraits and plaster likenesses. Eventually, all of the collections belonging to the National Institute were transferred to the Smithsonian—the Institute was dissolved in 1862—and, not without some ambivalence on the part of its Secretary, Joseph Henry, the Smithsonian was launched as the supporter of a major museum.

Art had been included as an area of responsibility in

Once attributed to Raphael, the painter of the *Massacre of the Innocents* is today also unknown.

John Mix Stanley (1814-72) painted *Osage Scalp Dance* in 1845. A devoted recorder of Indian life, he lent

the final legislation establishing the Smithsonian, although it was notably absent in earlier drafts, and James Renwick designated in his building plans a fine vaulted area for its display. No one in authority at the Smithsonian, however, showed much eagerness to promote the arts, except by an occasional pious statement. (See *View from the castle,* SMITHSONIAN, April 1976.) There was talk of purchasing casts of notable antiquities and architectural models, George Catlin's Indian paintings, and the portrait collection of the Philadelphia Bank of the United States. But, for lack of funds, no action was taken. In 1847 the Smithsonian did buy George Perkins Marsh's extensive collection of art books and prints, to satisfy its artistic obligations, but no more money was spent on art for some while. Ironically, it was during just these years that American artists were first finding patronage for creations other than portraits—the first landscape school was developing and paintings of American life were popular—but no effort was made to collect their works in Washington. No one thought of a national art collection in such terms. Had one been established, it would have continued to look to the European past for material.

about 150 works to the Smithsonian in 1852, hoping for government sale. All but five were lost in a fire.

Then, in 1865, there was a disastrous fire in the Smithsonian building. It attacked precisely that part of the structure where most of the art was displayed, and many works, including most of the Indian portraits by Charles Bird King and those by John Mix Stanley, on loan from the artist, were destroyed (for one that escaped, see below). The effect was traumatic. Not until the end of the century did the Smithsonian gather courage to collect and show works of art again.

For some years many of the Smithsonian's surviving paintings were shown in William Corcoran's stately Second Empire-style gallery, and the portrait of Guizot gazed down on a quite different architectural environment, its third since arriving in the United States in 1842. (The Marsh collection, meanwhile, was deposited temporarily in the Library of Congress.)

This beautiful building on Pennsylvania Avenue, constructed by William Corcoran for his collection, which once served as a haven for the homeless national collection, is now part of the museum's expanded activity. After being used as the Court of Claims for many years, it was restored and opened as the Renwick Gallery in 1972 to give support to the work of contemporary craftsmen and designers, as well as to provide an understanding of craftsmanship from the American past.

By the end of the century many seemed to feel that it was an outright scandal that there was no national gallery of art in Washington. Most major American cities now had comprehensive museums. Although the new building for the Corcoran Gallery on 17th Street was large and imposing in the latest Beaux-Arts style, it was not properly a national institution. In her will, Harriet Lane Johnston, the niece of President Buchanan, forced the issue by leaving her collection to a national gallery—*if* it were established (otherwise, the works would go to the Corcoran). Established it was by court decree in 1906; the much-traveled art collection of the Smithsonian was designated the National Gallery of Art. Efforts had been made over the preceding ten years to get the collection together again, but now its reorganization began in earnest.

How should a National Gallery look, in 1906? Richard Rathbun, the Smithsonian's assistant secretary in charge of the United States National Museum—the

Dr. Taylor, director of the NCFA since 1970, writes widely on American art. His next book, The Fine Arts in America, *is due in 1979.*

title given to the Smithsonian collections—set out to demonstrate. He converted a space in what is now called the Arts and Industries Building into a tasteful room for paintings. Mr. Rathbun would have preferred a skylight, but was happy to be able to install a discreet trough of electric lights to illuminate the collection. The space, however, was already far too small: many works could not be shown, and very soon other private collections were contributed to the newly dignified national collection. When the first 50 American paintings of William T. Evans' magnificent gift arrived in 1907, they had to be shown in the Corcoran Gallery.

The Smithsonian's United States National Museum was expanding, however. A large new building was being erected across the Mall from the original "castle" to house the natural history collections. In accordance with some obscure principle of organization, it was decided that it was appropriate for the National Gallery of Art to occupy the large central hall of the anthropology wing. As it turned out, this was not so misguided a move as it would seem, since the head of anthropology was the distinguished William Henry Holmes (p. 48) who was, in addition to his many other accomplishments, a very able painter. It was Holmes, in fact, who became the first officially designated full-time director of the Smithsonian's National Gallery of Art in 1920. He had a staff of three.

The "art hall," as it came to be called, was a wondrous place. Over the years between 1910 and the 1960s it became more and more densely packed with works of art of every description. American works from the Evans Collection vied for attention with the surviving works of the Institute and the European paintings given by Ralph Cross Johnson. In 1929, John Gellatly's collection added not only American paintings by Albert Pinkham Ryder (opposite), Abbott Thayer and many others, but also Far Eastern art, Renaissance jewelry, and European paintings and furniture from all periods.

Had Charles A. Platt's fine 1925 design for a building next to the Museum of Natural History been built, the course of art in Washington would surely have been different. Looking somewhat like his building for the Freer Gallery, it was to provide space for both history and art collections and work space for scholars. And certainly if the prize-winning design by Eliel and Eero Saarinen in the 1938-39 competition for a Smithsonian Gallery of Art had been constructed, it would have been not only the most modern art museum building in the country but would also have made possible a whole new direction in the national support of American art. But both remained only well-meaning conceptions. Not until 1968 did the long-suffering national art collection (it had been renamed the

Gift of S. C. Johnson & Son, Inc.

In the permanent collection: Sam Francis' airy, luminous *Blue Balls,* 1960, a noted work from a lively, accomplished period in contemporary U. S. art.

Romantic, reclusive, inspired by deep religious sense, Albert Pinkham Ryder anticipated many aspects of modernism. This is his *Flying Dutchman,* about 1887.

National Collection of Fine Arts in 1937 when Andrew Mellon's great gift to the nation was given the title of National Gallery) have a chance to emerge from its cocoon and stretch its wings. It happened in the very building in which many of the early acquisitions were first shown—the (now old) Patent Office.

The dual loyalty to past and present would seem to be another aspect that separates the American museum of John Varden's day from that of our own. Art, for a museum, once meant art from someone else's past. It adorned an environment that was appropriately remote from modern activity and change, and stifled impertinent curiosity with awe. But perception of the past changes under impact of the present, just as the values of the present are usually measured by the past. To cut off one from the other does a disservice to both. Looking back on the presentation of the national collection—the catholic clutter of John Varden and the Institute, the esthetic rigidity of Rathbun and the first National Gallery, the ambitious plethora of the "art hall"—it is evident that art has maintained its voice from the past in different ways, each related to the taste of the present.

Fascinating as the dim, heavily burdened walls of the old galleries seem to the modern eye weary of chaste interiors, to grant an artist of the past the same freedom as an artist of the present to speak directly to the public, to become a part of an active artistic environment that does not confuse dignity with the tomb, seems now only just. To keep art of the past alive in the modern consciousness is a worthy goal, and to do so it should be encountered in an environment of ongoing creativity. To participate in that sense of creativity, of exploration in both past and present, is a special way of possessing that makes a national collection the property of all.

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Golden poppy: California

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By Maxine A. Rock

Gorilla mothers need some help from their friends

Isolated, they tend to mistreat their young; in groups, they make good parents. Some human beings may behave in the same fashion

Isolated in a maternity cage, a gorilla named Paki drags her much-distressed newborn along floor.

As they float and bubble in the womb, gorilla fetuses look almost human. And, if they are born in captivity, they may suffer the same fate as some human offspring: injury, mutilation and even death at the hands of their mothers.

Scientists are watching the twisted maternal reactions of captive gorillas, hoping to find in them clues to why at least 70,000 human parents in the United States beat their own babies. While a lot of this human abuse comes from men, angry mothers, it seems, become more violent and inflict the worst damage. So do female gorillas.

These studies are going on in laboratories and zoos because, in the wild, gorilla mothers are gentle and affectionate. They rear their young in "families," protected by a dominant male and surrounded by other, seemingly content mothers. The male—also known as the silverback, for the handsome smattering of silver hairs acquired at maturity—plays with his babies like a friendly giant. He may tower up to six feet tall and weigh more than 400 pounds, but his touch is gentle with a newborn. The mothers, which are about five feet tall and weigh from 175 to 300 pounds, spend hours feeding and cuddling their babies. At dusk, mother and baby snuggle together in a nest of leaves and branches.

An Atlanta science writer, Maxine A. Rock first reported on the tribulations of gorilla motherhood in the September 1973 issue of SMITHSONIAN.

But in captivity, the gorilla's normal parental behavior is somehow warped. "When they are caged alone with their babies, abuse by gorilla mothers seems to be the norm," said Ronald Nadler, a psychologist at the Yerkes Regional Primate Research Center in Atlanta, Georgia. Nadler studies mother-infant relationships among the 17 lowland gorillas at the Center, the largest population in captivity.

Right now, in addition to serving as subjects for a variety of research projects, an important function of the gorillas at Yerkes is to reproduce. They've been doing that since 1972, when a pensive young gorilla named Paki gave birth to a daughter, Kishina. The baby was born in a stark maternity cage in the Large Animal Wing of the gray-walled Center. Kishina was Paki's first baby, the first gorilla born at Yerkes, and Nadler's first encounter with infant abuse among these great apes.

As SMITHSONIAN reported in September 1973, Paki did not take well to her new role. "Paki was a good mother for a little while," Nadler recalled, "but after a week she got annoyed with Kishina. She neglected the baby, wouldn't answer its cries, and then began dragging poor Kishina around the concrete floor.

"At first I thought the abuse stemmed from Paki's

Segou, a first-time mother in compound, looks content and maternal as she nurses her infant, Bom-bom.

Photographs by Ronald D. Nadler

Group learning for gorilla mothers

childhood experience," Nadler went on. "She'd been captured and taken from her own mother at an early age, and she had no chance to watch other female gorillas care for their young. Wild gorillas stay with their mothers for three to six years, and that's probably when they learn to be good parents themselves."

Paki never injured Kishina, but Yerkes veterinarians say she "pushed and dragged her around a lot." Her snarls grew deeper and more threatening, and eventually Kishina was taken away from Paki and raised by humans in the Yerkes nursery.

Nadler was depressed but not defeated. He kept tabs on both Paki and Kishina, and dipped deeper into studies of other abusive gorilla mothers. When a solution to the puzzle began to suggest itself, he invited SMITHSONIAN back to Yerkes for another look.

"At first I thought the abuse stemmed from the generally bad effects on gorilla social behavior which resulted from the animals having been separated from their own mothers when they were still infants," Nadler said. "Now I was beginning to see something more important: could it be that mothers—both human and gorilla—abused their offspring because the mothers felt lonely? I looked at the case histories of 30 first-time gorilla mothers, and only ten of them were able to care for their babies. The rest abused, killed or ignored the infants. Of the ten who were good mothers, seven were in a group, or with their male companions, during and after childbirth. It gave me an idea: why not give the new gorilla mothers some company, and see if it helps them adjust better to their babies?"

At about the same time that Nadler got his idea, some researchers in human child abuse were beginning to suspect the same thing: that social isolation and child abuse were somehow related. Women who regularly hurt their children told one doctor, Ray M. Helfer of Michigan State University's College of Human Medicine, that they did feel desperately alone. One mother said bluntly, "I never had anyone." Other psychologists started listing "social and kinship isolation" as a primary characteristic of the inadequate human mother.

Nadler's first chance to test his idea came in April 1974, after Paki gave birth to another daughter, Fanya.

Here Segou has put her baby upside down on her back. Unable to hold on, infant clutches fence.

Another new mother, Shamba, has done it correctly so infant is secure. Segou later learned proper method.

When Segou lifted her baby by one arm, the other mothers corrected her. Living in such a group appeared to make all the difference in how well the mothers treated and cared for their offspring.

Paki growled when the infant clung to her tightly. This time Nadler didn't wait for a crisis. He moved another female gorilla, Paki's old cagemate, into the enclosure with the troubled mother and her baby.

"My purpose was to distract Paki, who seemed to get irritated by the constant hanging-on of the infant," Nadler explained.

It worked. Paki calmed down, stopped growling at her newborn, and was able to raise Fanya on her own.

"That really got us moving here at Yerkes to let some gorillas live together, in a group," Nadler said. "We wanted to give these gregarious animals a family setting, and the same type of companionship they might enjoy in the wild. We figured it was our best chance of putting an end to the child abuse and our best chance to learn what we could from these advanced animals about the health and welfare of human beings."

Nadler supervised the moving of seven gorillas from stark cages at the main Center to a grassy 100-by-100-foot outdoor compound at the Yerkes Field Station in Lawrenceville, about 35 miles from Atlanta. On June 9, 1975, four female and three male gorillas were released together in the compound.

"There was some fighting among the males, and there was tension at first," Nadler recalled. "Some of the animals couldn't adjust, and we had to remove them from the compound, so eventually we wound up with one male and three females out there. Less than a year later, all three of the females gave birth!"

Gorilla births in captivity are still rare. The first one happened at the Columbus Zoo about 20 years ago, and there have only been about 150 gorilla births in captivity in the world since then. The births at the Yerkes gorilla compound were the largest number ever reported for a captive group in so short a time period.

"Now here's the real news," Nadler said. "All the females at the compound are first-time mothers, and all of them are rearing their infants competently. There's no child abuse."

The first gorilla to give birth at the compound, Choomba, had already been exposed to a social group in her younger years. She had a quick, easy delivery: an attendant visited her for a routine check on the progress of her pregnancy, saw nothing unusual, then came back five minutes later to find her sprawled on her belly licking birth fluids from a female infant. Three hours later the baby was clean, and Choomba was sighing contentedly as it suckled.

Eight days after Choomba's baby appeared, the second "compound" infant was born. This time it was a large male. It was the first baby for a young, nervous gorilla named Shamba. She fumbled with the baby at the beginning, but the sympathetic cooing of the other

gorillas seemed to calm her down. Within ten minutes Shamba's baby was suckling.

The last female in the compound to give birth was Segou. She, too, was young, inexperienced, and apparently confused by her baby: first she ignored it, then held it upside down. Finally—perhaps from watching Choomba and Shamba handle their youngsters—Segou stopped being awkward and learned to manage her baby with confidence.

This success at the Yerkes compound could push students of human behavior into closer teamwork with researchers such as Nadler. Dr. Roy Kern, of Georgia State University, Atlanta, said, "What Nadler says about gorilla mothers certainly makes sense when you talk about human mothers, too." Kern studies mother-child interaction in humans, and runs parent guidance sessions at the University's department of counseling and psychological services.

"A lot of things contribute to human child abuse," said Kern, "but I'm also inclined to think that the abuse we've been hearing so much about recently is indeed related to the loneliness experienced by today's young mothers.

"In years past, a human's family situation was like that of wild gorillas," Kern said. "Folks stuck together and there was always a grandma or an older sister to help when things got rough. Now the trend is to go it alone, out in the suburbs maybe, where the young mother is stranded all day with no company except that of her wailing child.

"No wonder she gets confused and depressed. She's like a captive gorilla in an isolation cage."

The days of the isolation cage are gone now at Yerkes. The three babies born in March 1976 are romping with one another and with gorilla adults in what Nadler calls "a setting that's as close to natural habitat as we can provide right now."

The setting has apparently been close enough to preclude infant abuse. The compound is big and sunny, and has quiet corners where gorilla mothers can congregate. These get-togethers may well be the vehicle for the shared experiences of motherhood which seem so vital for successful rearing of young.

The probable father of all three babies, Rann, is a favorite with the females. He intimidated a larger male to become "king of the compound," and Nadler says that Rann has probably sired all the infants because he established a more compatible relationship with the females than did the other males. Rann acts like a doting father, too; he insisted on touching and closely inspecting each infant when it was born. Now that they are toddlers, he sprawls in the sun while they play tag in circles around him, or crawl atop his massive chest and slide, giggling, to the ground.

"It's really too soon to give a complete interpretation of the extraordinary display of maternal behavior by the three gorilla mothers here," Nadler said. "But all of these mothers are raising their first babies so well. That stands in sharp contrast to the overall record of previous gorilla mothers which were forced to give birth and try to raise their babies in isolation. It really all points to a very beneficial effect of social companionship on gorilla maternal behavior.

"And if being together is important for good maternal behavior in gorillas," Nadler added, "this whole thing could be a key to understanding the relevance of social companionship to child abuse in humans."

Above, the mothers bring their babies to Rann, the probable father. Opposite, the affectionate and gentle giant watches the babies play along the fence.

By Paul Trachtman

Botanical Garden's 'Crystal Palace' is reborn in Bronx

Glass was falling in and the rotunda was going to rack and ruin; one woman's generosity saved a priceless New York gem

The night before the New York Botanical Garden reopened its spectacular 19th-century conservatory, the welders, carpenters, painters and horticulturists under its ethereal glass dome had the driven look of workmen trying to put the finishing touches on the creation before God's first sunrise. Aloft on scaffolding and ladders, welders dripped hot metal on the cacti and painters spattered the tropical ferns, while amidst the chaos horticulturists set the last plants in place.

The restoration of this great glass house had taken six years, and—with the dedication ceremony set for the next day—there was only one item missing. It was a highlight of the entire opening display, a date palm, known in the ancient world as the tree of life. It also was known to be a favorite plant of the benefactress who had given $5 million to restore the building, and for whom it has been renamed the Enid A. Haupt Conservatory.

A date palm had been ordered weeks earlier from Corona, California, but floods there made the fields impassable and truckers couldn't pick it up. With the opening almost at hand, the waters abated and arrangements were made to fly a specimen to New York. It arrived at 7 o'clock on the evening before the dedication, but there was a delay in unloading it. At 9

In 180-degree angle view of 90-foot-high central dome, palms soar behind orchid, *Cymbidium* 'Malagasy.'

Color photographs by Marvin E. Newman

In 1901 photograph, new conservatory's front facade shows the C-shape of 11 elegant greenhouses.

o'clock, two workmen from the garden drove out to the airport in a rented U-Haul truck. A Garden horticulturist followed in his car.

At the American Airlines freight terminal they found the tree in a 25-foot crate, and loaded it onto the back of the truck before anyone bothered to check the shipping charges. The bill was for $640, cash only, the Garden's credit reflecting the general opinion about New York cultural institutions in an era of fiscal crisis. While the horticulturist pondered the bill, the two workmen jumped into the truck and took off with the tree. In the terminal, an irate clerk ordered the horticulturist to call his business office and get the money. When the horticulturist asked to use the phone, the clerk told him to use a pay phone in the corridor. Instead he raced back to the Garden to plant the palm.

When he got there, the tree was being unloaded. The crate was pried open and the splendid specimen was hastily wheeled up a ramp into the hole that awaited it. "We planted it right away," a Garden official later admitted. "If the cops arrived, what could they do? They wouldn't know one palm from another."

By the time Enid Haupt snipped a lavender ribbon and entered the conservatory the next day, serenaded by a string ensemble and surrounded by the flowers and fruits of the earth, the great glass edifice was a serene sight for urban eyes. The sun sparkled through its 17,000 panes of glass, warming the misted air and the souls of New Yorkers who shoved their way into the hushed fragrance of the plant collections.

Standing in the northern tier of the Bronx, a partly blighted borough, the conservatory is a masterpiece of elegance inspired in part by the original Crystal Palace raised in London in 1851. When one of Bismarck's aides visited that London landmark, he wrote, "I call the spectacle incomparable and fairylike. It is a *Midsummer Night's Dream* seen in the clear light of midday." The spectacle in the Bronx is as fairylike, its soaring dome and sprawling greenhouses enclosing nearly an acre of land under glass.

It was erected by the least fairylike of men. A wiry

Paul Trachtman, former editor of Horticulture, *is now a free-lance writer who lives in Massachusetts.*

In Hanging Gardens area, bougainvillea blossoms are in the foreground. This greenhouse contains

After six years of restoration, and renamed for Enid A. Haupt, the complex' backside is now front.

an orientation center, hanging baskets of seasonal plants, miniature orchids, many rare species.

botany professor at Columbia University, Nathaniel Lord Britton went to England's Royal Botanic Gardens at Kew in 1888 to study a rare collection of tender greens, and came away green with envy. There was nothing in America to match the Kew Gardens Conservatory, a botanical wonder although the structure itself is best described as an architectural lump on the landscape. Dr. Britton returned to New York hell-bent to outdo the English, determined that if British botanists could have such a grand establishment, there was no reason Americans could not build a better one. It was an idea that flattered the ambition and pride of men like Cornelius Vanderbilt, J. Pierpont Morgan and Andrew Carnegie, who helped Britton found the New York Botanical Garden and its conservatory.

The structure, which took four years to complete, is laid out in the shape of a C, as a range of 11 connecting greenhouses. In the center is the palatial palm house, a 100-foot-wide rotunda with a 90-foot-high dome. At each end of the range is a cruciform house with ornate vestibules, reminiscent of George IV's seaside pavilion at Brighton. Actually, Britton wanted to extend the arc of greenhouses into an unbroken circle, with a second dome standing opposite the first, but the moguls who backed him apparently felt that one Crystal Palace in the Bronx was enough.

When the conservatory opened in June 1900, its plants were displayed more for the edification of botanists than for public enjoyment. Britton packed in as many plants as he possibly could, fitting 8,833 specimens into dense rows of pots and tubs. The conservatory teemed with diversity, from begonias to banana plants, from showy tropical orchids to queer African stapelias, or carrion-flowers, described by the curator as bearing "odd and curiously colored flowers with an unpleasant but characteristic odor."

Although the Board of Managers considered appropriating $10,000 to stock the new conservatory, so many plants were sent as gifts, by Columbia University and by the owners of overgrown private greenhouses, that Professor Britton could boast he spent less than $100 to amass the entire collection.

The outpouring of support for the New York botanist's dream of "an American Kew Gardens" was no

At a benefit for 250-acre garden, benefactress Haupt stands with chief horticulturist Carlton Lees.

surprise in an age when philanthropy was in flower and the city could easily set aside 250 acres of farm and pasture land as a garden. Three-quarters of a century later, however, the place was in such neglect that a city commissioner, on going to the Bronx for a look, wondered if it was even worth designating as a landmark.

The decay of the conservatory tells something about the decline of New York. Beset by age and neglect during the Depression years, the structure was first refurbished for the 1939 World's Fair. Some of the building's *fin de siècle* finery had fallen away, and the rest was stripped off to modernize the premises, in keeping with the futurist theme of the fair. Serrations along the ridges of the conservatory were removed, ornate fans torn out of their semicircular windows, and elaborate filigree work stripped from the doors. Only one graceful detail survived, a pergola atop the palm dome which served as a ventilator.

In the 1950s the city made further improvements, its Parks Department architects agreeing to repair the entrances to the palm house. The old Corinthian pilasters were demolished and a massive Bauhaus front with stainless steel facade and metal doors was erected, making the entrance look like a Fifth Avenue storefront. The back entrance was walled up with brick.

Inside, the greenhouses were beginning to fall apart. The president of the Botanical Garden, Howard Irwin, recalls the scene when he arrived as a research botanist in 1960: "The heating system leaked terribly. There were plumes of steam rising up everywhere. Ventilators on all the chambers were stuck shut. They were made of Florida cypress from the Everglades, an excellent wood for the purpose, but the dowels which held them together were made of a wood that rotted, so we didn't dare open them.

"Thermostats didn't work. The desert house was always too cold and the palm dome was always roasting. There were frequent electrical shorts and small fires, owing to the inroads of humidity and insects eating insulation off the wires. Over the years, the kinds of plants that could live under these conditions diminished, and the greenhouses became overgrown with the tough nuts that could survive. It all became just one big tunnel through amorphous verdure."

Then the glass started falling. Screws in the strips that held the glass in place were corroding. "By the late 1960s," Irwin recalls, "we had to close whenever there was a high wind because so much loose glass fell in. We just sort of had our thumb in the wind all the time, and if it was blowing very hard we'd close. People never knew whether we were going to be open or not."

Irwin finally proposed to the Garden's governing board that they either tear down the conservatory or restore it. The debate he set off developed into an institutional crisis of conscience. The board was comprised mainly of lawyers, bankers and businessmen from Manhattan's affluent East Side, who authorized engineering studies which showed that the structure,

originally built for $180,300, would cost at least $2.5 million to save. The figure shocked one board member who exclaimed, "Why don't we just take all the glass off and let vines grow, and it will make a fine arbor?"

Hardly anyone on the board lived in the Bronx, and Irwin had only recently moved into a comfortable stone cottage on the grounds of the Botanical Garden. "We didn't really know how the community felt," he says. "But we were at a time in our institutional history and social evolution when it was obvious that institutions were going to have to go out into the community and serve community needs, not just sit here as bastions of privilege and say, come see us."

After a campaign of attending the meetings of community planning boards and civic associations, Irwin says, "It was quite clear that if the conservatory were allowed to go down, the Garden's reputation would never survive it. Despite its decay, that building was looked on as the orb of the Bronx. It had to survive."

His persistence and some prodding from the Garden's architect, Edward Larrabee Barnes, as well as the gentle barbs of Ada Louise Huxtable, architecture critic of the *New York Times,* persuaded the board. "There was no arm twisting," Irwin says. "The board just finally realized that this was a responsibility. It became almost sacred." The momentous decision was made in 1972, not only to save the structure but to restore it, and Irwin began calling on foundations, philanthropists and the city in search of money.

There was no rush of donations, but in 1975 the city agreed to put up half the cost of construction, up to $1.5 million. A little later, the falling glass in the conservatory was forgotten as the city's own roof fell in. New York was on the brink of bankruptcy, and sent a telegram to the Garden saying that its contribution would be "deferred."

The Garden, in a show more of courage than confidence, decided to go ahead on its own. "We didn't have the money in hand," says Irwin. "It was really extending the neck. But we hoped that if we got started, we would generate enough interest to finish it."

It was an inspiring decision to the man the Garden had hired to direct the restoration. Carlton Lees, a former executive head of both the Pennsylvania and

Guests at the spring party chat on skywalk in
the Fern Forest, which overlooks simulated crater.

Bronx 'Crystal Palace'

Old World Desert House has such plants as exotic South African euphorbias in foreground.

Massachusetts Horticultural Societies, had come to New York after a discouraging decade of battles with Boston's Brahmin establishment.

Lees' great plans for renovating the cavernous exhibition hall in Boston, with a glass wall that would present a vista of plants to the city, bogged down in a board that, while it might raise its own rhododendrons, could not decide to raise money. His experience in New York afforded a striking contrast.

To raise funds for the restoration, the Garden threw a grand ball in the derelict conservatory on May 1, 1975. Lees took charge, laying down turf and filling the dome with flowers to create a garden party amidst the early construction work. It rained, and workmen hastily tried to cover sections of the roof with plastic sheets. As guests stood about, Lees noticed gaps here and there in the crowd. "I knew the roof was leaking," he says, "and when Doris Duke gets dripped on, you get a little worried."

The May affair brought a new atmosphere to the Garden as 450 people found themselves surprised to be in black tie and in the Bronx at the same time. And as the flush of social success faded, the Garden received its first major support for work on the conservatory. Mrs. Paul Mellon had attended the ball, and arranged for a gift of $500,000 from the Mellon Foundation.

Money came from others as well, but requirements for the restoration outpaced the Garden's ability to pay for it. The great dome was in far worse condition than anticipated—it rested precariously on hollow concrete piers, the steel inside them having rusted away—and the cost of its restoration kept increasing with inflation. One evening at the home of a board member, Lees was asked why he hadn't started with the dome, the centerpiece of the whole conservatory. His questioner was Mrs. Haupt of the Annenberg family, former publisher of *Seventeen,* who had endowed other gardens but shown little previous interest in the conservatory. "The dome will take care of itself," Lees told her. She asked what he meant. "If we do it house by house," he explained, "and skip the dome and go on to the rest, it will be so obvious that someone will come forward." Before she left that evening, Mrs. Haupt came forward with $850,000 for the dome.

The sense of contributing to beauty was growing on her. Howard Irwin was at wits' end the day she invited him, along with Carlton Lees and several other Garden officials, to her Park Avenue apartment for lunch. "It was a strange sort of meeting," he says. "Everyone was walking on eggs. And her apartment is a difficult place to carry on business because it's just dazzling with all the artwork in it. You can just sit there and be consumed by magnificent decor, furniture, paintings, rugs, everything. We didn't know if she was going to upbraid us for being such poor businessmen—we'd gone from $2.5 million to three or four, and now what was it?—or what else she had in mind.

"We went in trying not to be foolish, not to get down on our knees and beg, but on the other hand to tell her

In American Desert House, skeleton of a dead Saguaro stands at left of a 100-year-old living one.

the truth. And she just sort of blithely said, in the course of a sentence about something else, that this meant so much to her, more than she ever dreamed it would when she first heard of it, that she wanted to cover the whole thing. In that way she would feel she had done something really worthwhile in the city.

"She used the analogy of buildings in Manhattan named for people who only paid for one or two floors, and she didn't want to be in that class. If she was going to be involved with this building at all, she wanted to justify attaching her name to it in any way by the magnitude of her support.

"We all came away, not really having said very much to her, with five different impressions of what had happened in there. There had been great economy of words, and we couldn't really trade views in there. We couldn't even look at each other. So when we got outside we had a sidewalk conference on just what *had* happened. And we still couldn't believe our ears."

The complete restoration assured, work on the conservatory moved on from structural repairs to the details of ornament. The original plans had been lost somewhere in the city's Parks Department. All that architect Barnes had to work with were some early photographs of the structure (p. 66). An architectural historian was enlisted to find a way to re-create the original castings. Ornamental casting of this sort is a lost art that flourished between about 1860 and 1890 in this country, and was on the way out when the New York conservatory was erected.

Wanted: a rarity among carvers

But further research turned up a specialist in 19th-century restorations who could make detailed drawings from the old photographs. Next, a woodcarver was needed who could make patterns for the molds used for ornamental cast iron. Such carved patterns must have a slant, or "draft"; otherwise the wood won't come out of the mold after it hardens. A woodcarver who could carve flowers in this way, and create the patterns for some 12,000 ornamental parts, was as rare as a flower on the endangered species list.

The search led to Salt Lake City, where woodcarver Ron Rumel was carrying on a business established by his grandfather, and a tradition that went back even further in his family, to the days of Brigham Young. "One of the ancient Rumels," he says, "spent his entire life working on the Salt Lake Temple, doing this kind of ornamental pattern making." Rumel made the patterns and a Utah foundry poured the castings, using aluminum instead of the original iron.

With Mrs. Haupt's millions for restoration, other gifts could be lavished on the design of gardens and plant collections inside the conservatory, for while the building itself was a reminiscence of things past, the world of horticulture within it was to be a living museum of reality amidst the artificialities of modern life. "The city is an artificial experience," Carlton Lees says. "It's all made by Man. The more urbanized we get, the more artificial life becomes, from computers to corrugated french fries. What's here in the Garden is real." Lees planned a panorama of the plant world, and Man's relationship to it, with the panache of a botanical P. T. Barnum, highlighting one exhibit with an ivy hippopotamus (p. 73) and other animals from Pliny's Topiary Zoo, installing a typical grocery shelf in an exhibit where children could pick up packaged foodstuffs and find the plants from which they are derived in a sort of horticultural hide and seek.

Lees made all the exhibits, whether an orangerie stocked with citron and olive trees, or an American desert under glass, into inviting habitats where "plants speak to people." Throughout the range of greenhouses he sought to make the plant world comprehensible. "This was an institution almost solely focused on science," he says, "and as a result it forgot to speak

Papyrus in a pool of Tropical House, where plant fossils appear with their living counterparts.

to the public. That's the reason it went downhill."

His words reflect his own background, for he earned a college degree in plant sciences, went on to graduate school for a master's, but resisted the temptation to pursue a PhD. "I didn't want to get restricted to counting the number of cells on chrysanthemum leaves," he explains, and instead he cultivated a broad interest in the arts and humanities of the garden.

Lees did not throw botany to the winds, but endeavored to let plants speak for themselves. And Howard Irwin, whose botanical research in the tropics aroused his concern for the rampant destruction of plant habitats there, admires what Lees has done. The people who commune with floral beauty in the conservatory, he believes, can better appreciate the need to preserve the botanical diversity of the world.

"The plants that grow up here in our latitude," he says, "are only the lunatic fringe of the floral world. They haven't been here very long, and they are in fact the pioneers that have moved back and forth with the various glaciations, and don't represent the heights of specialization. Yet botany got started in temperate areas, the idea of evolution got started in temperate areas, and somehow the tropics got looked upon as just bizarre. That's the wrong orientation, and the conservatory is a place where we can point that out."

Even Lees' horticultural whimsies have a point. The animals inspired by Pliny's Topiary Zoo represent the evolution of a gardening style that charmed first-century Romans, flourished in the Middle Ages with clipped menageries and aviaries decorating royal gardens, and again in 17th-century England where it was refined into elaborate landscape scenes of deer hunts and battles, until English taste rebelled against its geometric formality. Lees says, however, that he added the ivy animals mainly for fun: "Isn't that reason enough?"

The conservatory planting now bears little resemblance to the botanical archive Nathaniel Lord Britton assembled in 1900, and Lees believes the pleasure it affords people is worth all the millions it cost. It is, as he says, an oasis for urban people in search of a natural habitat. Conservatories were not always seen that way. The Roman philosopher Seneca abjured them, asking, "Do not those live contrary to nature who require a rose in winter and who, by the excitement of hot water and an appropriate modification of heat, force from winter the later blooms of spring?"

In an age when most of us live contrary to nature anyway, perhaps Carlton Lees is right in describing his garden as a last outpost of reality.

Hippo of English ivy, flanked by flowers, stands in Topiary Zoo, inspired by Pliny's Roman garden.

Pliny's Topiary Zoo
Training trees and shrubs into animals and other fanciful forms is a curious craft that dates back at least as far as Pliny the Younger in the first century A.D. The topiary style declined with the Roman Empire but reappeared in 17th century Europe. It reached a height in the 17th century when palace gardens had elaborate topiary vessels. At least in England, as symbolism of nature in its own right found its way into man's consciousness.

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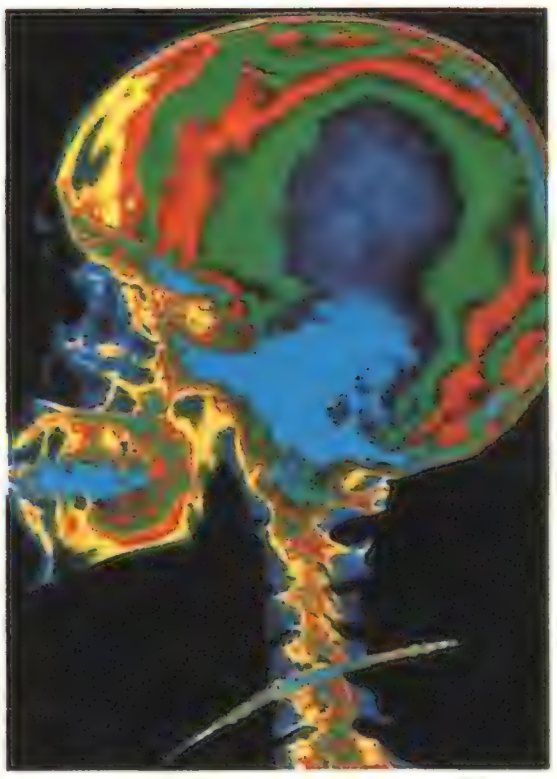

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National Portrait Gallery

Quinn's portrait (1908) is by John Butler Yeats, father of the poet, who came to America to live (and die).

Three powerful writers and a patron form a notable quartet in Paris, where photograph was taken in

By Piri Halasz

A rich attorney who collected art and bohemians

John Quinn's taste for the new and good after turn of century resulted in a great collection and, also, a most interesting life

When part of John Quinn's library was being auctioned off, in 1923, to raise funds further to expand his art collection, a friend wrote to compliment him on being "one of the immortals." Quinn's response was characteristically vehement. "I want to be classed among the alive," he wrote back. "The living, the kicking, the fighting, the progressing; above all, the alive."

This attitude had led the Manhattan lawyer to an extraordinarily rich relationship with living arts and letters. In 1902, he had made friends with William Butler Yeats, Lady Gregory and other leaders of the "Irish literary renaissance." By 1920, he had befriended James Joyce, T. S. Eliot and Ezra Pound, when these future giants of English literature were still struggling, broke and practically unknown.

Above all, he had collected modern art—by Picasso, Matisse, Brancusi and dozens of others. By the time of his death in 1924, at the age of 54, he had accumulated some 1,500 examples of such work in his Central Park West apartment. This, in an era when modern art was often attacked as "Bolshevik" and "degenerate."

Quinn wasn't the only venturesome American collector of the period. He had perhaps a dozen major

November 1923. They are, from left: Ford Madox Ford, James Joyce, Ezra Pound and John Quinn.

rivals, including the Stein family, most notably Gertrude; Alfred Barnes, the Argyrol millionaire; and Walter Arensberg, intimate of the New York Dadaists. However, Quinn was the greatest American collector of the art of his day, according to Alfred Barr, who from 1929 to 1967 was the guiding genius behind Manhattan's Museum of Modern Art.

The irony is that so little evidence remains of Quinn's activities. The Barnes Collection has its own museum, while the Arensberg Collection is in the Philadelphia Museum of Art. But, according to the terms of his will, Quinn's collection (which also included Oriental and primitive art) was dispersed through private sales and auctions.

He wanted to leave his sister and niece provided for, and modern art was then a chancy investment. The sales brought in less than the half-million dollars he had spent—only about $400,000. Today, works known to be from the Quinn collection reside as far afield as South Africa and Japan, but only about 500 items have been tracked down.

Undaunted, the Hirshhorn Museum and Sculpture Garden in Washington has mounted " 'The Noble

Photographs below: Aline Saarinen Papers, Archives of American Art

Quinn loved to visit artists and writers whose works he supported and bought. Here he is with Picasso, companion Jeanne Robert Foster and Olga Picasso.

Henri-Pierre Roché, left, was Quinn's friend and on-the-scene adviser. Between them are Mrs. Foster, on the left, and Olga Picasso.

Time out from golf at Fontainebleau: composer Erik Satie, Quinn, sculptor Constantin Brancusi, one of Quinn's favorites, and Roché. Taken in October 1923.

Hirshhorn Museum, lent by E. M. Bakwin

Gauguin's pre-Tahitian *Caribbean Woman with Sunflowers,* 1889-90, was bought by Quinn for $2,600.

Buyer': John Quinn, Patron of the Avant-Garde," an exhibition of 79 paintings, sculptures and drawings owned by Quinn at his death. The exhibition, which runs through September 4, was organized by Judith Zilczer, a historian at the Hirshhorn, and the art is borrowed from museums and private collectors in the United States, Great Britain, Ireland, France, West Germany and Barbados.

Quinn plunged into every phase of Picasso's multi-faceted development, owning 52 of his paintings in all. Matisse and Brancusi were the two secondary passions of Quinn's mature collecting phase.

Seven Brancusis range from the droll limestone *Kiss* of c. 1912 (p. 83) to the monumental oaken *Endless Column* of 1918. They testify to a patronage that was also a friendship (carried on mostly by mail). Quinn ordered his gleaming polished bronze version of Brancusi's *A Muse* (p. 82) from the sculptor after having seen a marble *Muse* owned by the American artist Arthur B. Davies. Quinn called the work, "The Woman with the Goitre." Brancusi replied that "Muses always have something distinct about them."

One may view works by Braque, Gris, Laurencin, Gino Severini, Derain, Dufy, Marcel Duchamp and his sculptor-brother, Raymond Duchamp-Villon, Gwen John, Rouault, Redon, Cézanne, Van Gogh and Seurat —among the artists who worked in France. Quinn's concern with English art shows up in a canvas by Augustus John, sculpture by Jacob Epstein, and works by Henri Gaudier-Brzeska and Wyndham Lewis, two exponents of English Vorticism. Nor did Quinn ignore his countrymen, as may be seen in pictures by Davies, Walt Kuhn, Maurice Prendergast, John Marin and Charles Sheeler, among others.

If the works are not all of equal quality and display diverse sensibilities, that makes the exhibition a more reliable index of Quinn's tastes—which changed as he went along. Particularly in his early years, he made mistakes. He invested for reasons of sentiment, sometimes in works by artists who have faded into obscurity, but he proceeded from innocence to sophistication.

The son of Irish immigrants, Quinn was raised in Fostoria, Ohio, where his father was a prosperous baker. The boy read avidly. Before he left high school, he had bought, from his allowance, first editions of Pater, Hardy, William Morris and Meredith.

Still adolescent, Quinn nominated former Governor Charles Foster for Congress. Foster was named Secretary of the Treasury, and Quinn went to Washington with him as private secretary (Foster's daughter, Annie, was smitten with Quinn—the first of many women who would try in vain to lure him to the altar). The young man earned his $1,800 salary and also studied law at Georgetown University. After a year of graduate work at Harvard, he came to Manhattan, started as a law clerk, and in 1906 set up his own office.

Quinn won the confidence of Thomas Fortune Ryan, the copper magnate, by advising him in the battle to win control of the Equitable Life Assurance

Albright-Knox Art Gallery, Buffalo, New York
Fellows for Life of 1926 Fund.

Picasso's lyrical work, *La Toilette,* 1906, purchased in 1923 for $5,375 from dealer Ambroise Vollard.

Society. The lawyer was soon receiving handsome retainers from Ryan and other prestigious clients. Active in politics, Quinn still found time to read everything from Henry James to Nietzsche. By 1910, he was acquiring books at the rate of 800 to 1,000 a year.

Quinn's art collection started modestly, with etched portraits of his literary heroes. However, he wanted to visit Ireland and meet Yeats. When he read that Yeats' painter brother, Jack, was having an exhibition in Dublin, he wrote—and learned that both Jack and his father, John Butler Yeats, also a painter, would be glad to show him their work.

Quinn visited Dublin in 1902, charming nearly everyone with his tall, aristocratic figure, the literacy of his conversation and the openness of his purse. He bought ten of Jack Yeats' pictures, commissioned portraits from the father—and met the poet. "John Quinn is the nearest approach to an angel in my experience," the elder Yeats later wrote.

Returning to New York, Quinn arranged an American edition of William Butler Yeats' newest play, and set up the poet's first lecture tour of the United States. Quinn also assisted Lady Gregory and the controversial Abbey Players on their visits to America, and he looked after the elder Yeats, who settled in New York in 1908.

Keeping up with art and artists

Meanwhile, Quinn was expanding his art collection through acquisitions of sentimentalized landscapes by Irish artists whom he had met and liked, such as Nathaniel Hone and George Russell. Then, through W. B. Yeats, Quinn heard of sterner stuff: Augustus John, the maverick English painter who was defying the genteel Royal Academy with his flamboyant portraits of gypsies and eerie Symbolist figure studies.

Quinn met John in London in 1909. John did a portrait of Quinn that was anything but flattering; Quinn admired his spirit, and bought the portrait. He offered to give John £300 a year (about $1,400) in return for pictures of that value. John went off to the south of France, produced only small, informal sketches, and wrote articles about gypsies.

The two met again in London in 1911, and set off for Paris, where Quinn's client, Ryan, lent them his Mercedes and German chauffeur. Artist and patron spent two hectic weeks visiting points of interest between Paris and Marseilles. John introduced Quinn to his old haunts, including a brothel, and they shared many a bottle—to a point which Quinn, normally a cautious drinker, found hard to believe.

Once, when they were driving down a steep, narrow road, Quinn wanted to slow down. "How do you say 'slow' in German?" he asked John. *'Schnell,"* John replied, with 100-percent inaccuracy. *"Schnell,"* ordered Quinn. The chauffeur obediently accelerated. At another point, Quinn found the driving so harrowing that he flung himself out the window, landing shaken but intact.

John could—and did—advance Quinn's tastes in art. John told Quinn about Epstein and about his own reclusive sister, Gwen. John was "powerfuly impressed" by Cézanne, Van Gogh and Gauguin, though still dubious about Matisse. John took Quinn to see Ambroise Vollard, Cézanne's dealer, but he was afraid to buy.

Art Critic Piri Halasz, formerly of Time, *teaches art history at C. W. Post College, Long Island.*

Collector and bohemians

By the time Quinn was in Paris again, the next year, he had worked up to buying a Cézanne, a Van Gogh and a Gauguin. He became involved in New York's famous Armory Show of 1913, organized by an association of American artists to introduce European modernism, in all its splendor, to the American public.

Quinn served as legal adviser, drawing up the association's incorporation papers. He helped arrange renting of the 69th Infantry Armory, and escorted his good friend Theodore Roosevelt through the show. The lawyer's ascetic-looking figure could be seen at a banquet given for the press, at an artist's ball (dressed as a cardinal), even snake-dancing with the artists through the exhibition on closing night.

He was both the largest lender to the Armory Show, and its most generous private patron, paying $5,808.75 to purchase works, including a Derain, two bronzes by Duchamp-Villon, three Redons, and two pictures by Walt Kuhn, who had worked with Quinn and Davies in organizing the exhibition.

Even so, Quinn's purchases from the Armory Show were, on the whole, conservative and often uninspired. But he did get a feel for contemporaneity.

"When one leaves this exhibition," he wrote to a friend, "one goes outside and sees the lights streaking up and down the tall buildings and watches their shadows, and feels that the pictures that one has seen inside after all have some relation to the life and color and rhythm and movement that one sees outside."

In 1914, the year after he had won a legal battle to get contemporary art admitted duty free to the United States, Quinn purchased his first Brancusi. The next year he picked up six Picassos and his first two Matisse oils. He was buying wholesale from the galleries springing up in New York, meddling in their politics, taking chances on both European and American artists. The prices he paid seem absurdly low today, but then buyers were scarce and his purchases appreciated.

He found a job for Marcel Duchamp, then living in Manhattan. Quinn began corresponding with Rouault, Brancusi and artists who were soldiers at the front. He paid for having some of Raymond Duchamp-Villon's plaster sculptures cast in bronze, and underwrote a book on the sculptor after Duchamp-Villon died in 1918.

In 1915 Quinn read an article by Ezra Pound, attacking American collectors for buying "faked Rembrandts" while moderns like Epstein were starving. Quinn fired off a letter to Pound, describing his own collection and the troubles he'd had with Epstein. "Instead of being a 'dead one,'" he concluded, "I think that I am as much alive to good art as anybody."

Thus began a highly productive friendship. Quinn arranged for publication of Pound's books, and helped support the little magazines Pound was involved with. Pound steered Quinn to the English Vorticists and to Eliot and Joyce. Quinn got Eliot's first volume of poems published in the United States. In gratitude, Eliot gave him the original manuscript of *The Waste Land.* The document is fascinating because it shows the extensive editing Pound did on the poem, explaining why it is dedicated to him as "Il miglior fabbro" (the finer craftsman).

Quinn defended *Ulysses* in court in New York in 1920, when Joyce's novel was being published in installments in the *Little Review.* Censors had suppressed the "Nausikaa" episode as pornography, and Quinn did not succeed in getting the ban lifted. Nevertheless, his arguments form the germ of the defense that eventually cleared *Ulysses* for U. S. publication, in 1933.

"Museum pieces" which no museum would show

By 1919, the collector had concluded that it was not enough to collect modern art indiscriminately. He had to have the best. To that end, he recruited the French journalist, Henri-Pierre Roché, to scout for him. Quinn's guidelines: "I am going to try to limit my purchases to first-rate examples, to work of museum rank or what we sometimes refer to as star pieces."

It took radical thinking to demand works of "museum rank" in an era when no museum would exhibit the most advanced work Quinn was collecting. Roché sent him photographs, descriptions and advice. Through Roché, Quinn acquired many Picassos and Seurat's late masterpiece, *The Circus.*

Two major buying sprees came in 1921 and 1923, when Quinn was in Paris with Roché to assist him. The lawyer was traveling with his last and greatest love, Jeanne Robert Foster, a poet and editor. Together, they visited Picasso and his wife Olga ("It is

Museum of Modern Art, Gift of Mrs. Simon Guggenheim, 1939.

A prime work of the modern era, Henri Rousseau's *Sleeping Gypsy* (not in the show) caught Picasso's eye in Paris. He tipped off Quinn's adviser; Quinn got it for $7,772, a fair price at the time.

rare to find an amateur who really loves pictures," Picasso said. "He, he loved them. And what agreeable and natural friendship one could have with him.")

Quinn lunched with Pound and Joyce (giving Joyce medical advice—to get his teeth fixed). The Derains entertained Quinn and Mrs. Foster, and Quinn visited Matisse. Gwen John was living in Versailles. A Catholic convert, she spent much time with some nuns who ran an orphanage; when Quinn saw that the children had no jam with their bread, he gave the mother superior money for jam.

In February 1924, Roché cabled Quinn excitedly. Picasso had seen a large and marvelous Rousseau for sale. The picture "has quite upset me," Roché wrote. "I have dreamt of it all the night." When *The Sleeping Gypsy* (above) arrived in New York, Quinn called it "the gem of my collection." (The huge painting is not in the Hirshhorn exhibition because it is too fragile to travel.) It was his last purchase; in July he died of cancer of the liver.

Most of his voluminous literary and artistic correspondence went to the New York Public Library, where it has proved a rich lode for scholars, not least those seeking to unravel the mysteries of Quinn. For he was neither a simple man nor, despite his generosity, an altogether lovable one.

He could, his biographer Benjamin Reid observes, bully his acquaintances. Not modest, Quinn often told one friend what he had done for another. The letters are laced with anti-Semitic references, and that is only the beginning of his animosities. He could snarl, "Not one woman in a hundred knows how to carry a conversation along."

Quinn railed at the Germans, the Italians and at America as "the most backward economically, the most provincial socially, the most reactionary, the most capitalistically controlled, the most influenced by money, has less freedom of the press, less of the sense of freedom, less real democracy than any civilized country in the world, with the possible exception of Germany."

Philadelphia Museum of Art, Louise and Walter Arensberg Collection, 1950.

In verse, he expressed his hostility toward the Irish (whom he frequently aided in matters political as well as artistic):

Damn, damn, damn the Gaelic Leaguers,
Damn the Parliamentarians too
Damn, damn, damn the Clan-na-Gaelers
Damn all the Irish missions through and through.
I am sick and tired of their stories
Of all their hard luck tales and plaints;
I think that they have become a race of spongers,
And have long since ceased
to be the land of saints. . . .

In fact, the only nation Quinn seems entirely to have approved of was France, and he sounds almost naive when he describes (to Lady Gregory) his idyllic visits with the artists: "Last summer in Paris I often saw Constantin Brancusi, the Romanian sculptor, half-god, half-faun, delightful always and always happy; Picasso, an artist of genius, a man who would go through with anything he understood, happy most of the time."

Yet, with all his flaws, Quinn still seems very much on a wavelength with his distinguished correspondents. The bluntness, earthy humor, energy and enthusiasm which pervade his letters make one forget they were written more than 50 years ago. "Bully for you," he cries to Ezra Pound, upon learning that Pound has written to the Metropolitan Museum about showing the Vorticists' work (though, of course, the project is doomed for failure, as the Met's director is, in Quinn's opinion, "hopelessly female, without guts or balls, a sort of soft snob").

Quinn himself is always positive, encouraging, intelligent and practical (in the case of the Vorticists, recommending a small Manhattan private gallery, issuing instructions for crating and shipping, arranging framing and supervising much of the show himself). The lawyer is genuinely sympathetic and concerned with the people he is writing to, or about—fussing not only over Joyce's teeth, but also his eyes, trying to set up medical consultations for him in Switzerland.

Beyond all else, one gets a feeling of independence from Quinn's letters. "I was in a law partnership for five years once," he confides to Pound. "They were trying years. I only stood them because I was independent as the devil and felt that at any time I could say to them, 'To hell with you and your law business, I am going to step out of here.'" The artists and writers he patronized shared that intense sense of independence. Possibly Quinn's possession of it, more than anything else, enabled him to appreciate their diverse talents.

Museum of Fine Arts, Houston, Gift of Mrs. William Stamps Farish and the Brown Fund, 1961.

Quinn, devoted to Brancusi's work, owned some 20 of his sculptures, including bronze version of *A Muse*.

Brancusi's *The Kiss* was purchased in 1916, four years after its completion, for $1,048.

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"Food for the tribe!" Smithsonian's Dennis Stanford triumphantly brandishes "fresh" meat carved from Ginsberg with Stone-Age tools.

By Edwards Park

The Ginsberg caper: hacking it as in Stone Age

A Smithsonian scientist and team relive an ancient kill that could double time of Man in America

Her name was Ginsberg. She was 23 and had appeared in a movie. Then, tragically, she died of a blood clot in Boston, and I helped cut her up with a flint knife.

It is possible that the paragraph above may need a fuller explanation.

Ginsberg was a female African elephant, one of the stars of the film *Hatari.* A tranquilizer shot at Boston's Franklin Park Zoo brought her down, and she broke a leg. The fatal clot resulted.

I got into this situation because I know Dennis Stanford, one of the Smithsonian Institution's most remarkable scientists (see *Around the Mall and beyond,* May 1977). Dennis (left) is an anthropologist, and no sooner had Ginsberg slipped away to her Great Jungle in the Sky than he was begging the Institution to acquire her mighty remains and ship them to him so that he could test out some pretty sound theories of how Americans of 10,000 to 20,000 years ago supported themselves. Competition for the elephant was stern. Ginsberg's head went off to Harvard and her insides were gathered up by the Franklin Park people for an autopsy. But the Smithsonian got the rest of her—some 4,000 pounds—and lugged her down to Front Royal, Virginia. There, at the National Zoo's Conservation and Research Center, she lay frozen stiff under drifting snow on a bleak hillside (p. 86).

In March a thaw set in, giving hope that the grim winter of 1977-78 was ending. And as the sap stirred in the trees, so the crystalized remains of Ginsberg gave the first signs of loosening up, of

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becoming, instead of a snow-swept heap, the corpse of a very dead elephant. So Dennis Stanford mobilized his anthropological team and moved to that Front Royal hillside to do his stuff.

Dennis has recently discovered in Colorado what appear to be ancient butchering places. They contain bones of mammoth and bison (the extinct bighorn bison, *Bison antiquus).* There are numerous "projectile points," which were often used as cutting blades. Some were made of stone while others, much older, appeared to Stanford to have been made from fragments of the bones themselves. If these bits of bones were indeed shaped by humans, some serious questions would arise about the time of the arrival of Indians on this wild continent.

The great animals had apparently been hacked to pieces by the tools. The skeletons were "disarticulated," which is a scientist's way of saying that the leg bones weren't connected to the knee bones. Forequarters were often piled in one area, hindquarters in another. Stanford theorizes that the animals had been herded into these sites when deeply drifted snow immobilized them. Then the Paleo-Indians slaughtered them with spears and butchered them with knives, packing the meat off to be stored in snow for feeding the tribe.

The hypothesis sounds convincing to a layman, but Dennis Stanford, behind his easy and informal manner, is a meticulous scientist who likes to prove things out to the best of his ability—considering that the events took place at least ten millennia ago. He has already tried butchering a dead calf with stone and bone tools. It worked fine, but a calf is a tender little thing compared to a mammoth. If Dennis could get his hands on a dead elephant, now . . . *that* would be something. Hence his eagerness for the lamented Ginsberg, up on the hill.

For a couple of days I joined Stanford's devoted corps of young, blue-jeaned anthropologists, all zipped into ski jackets and laced into hiking boots. We gathered beside a barn, high on the hill that rises behind the research facility's buildings. In the barnyard, on a pile of straw, lightly

Dusted with snow, remains of Ginsberg sprawl on a hillside at the National Zoo's research center, awaiting a thaw that will allow experiment to start.

100 years later, the wounds still bleed.

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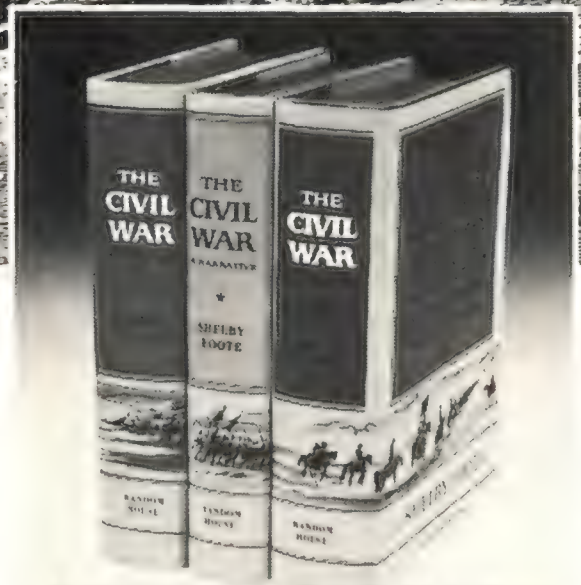

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Stanford (right) and his assistant, Tommy Fulgham, check wear on stone knives,

dusted with March snow, lay the crumpled carcass. We spent no time in mourning, for we all knew that very soon that mountain of meat would thaw enough to send its message for at least a mile in any direction the spring zephyrs blew, and that work on her would then be all but impossible to do.

First, to simulate the actual slaying of the great beast. Errett Callahan, of Catholic University in Washington, D.C., is an expert on the use of Stone-Age spears and the spear-thrower, or atlatl. This device is easily made from a straight section of sapling, perhaps 18-inches long, cleanly pruned except for a stub of a branch at one end, forming an acute angle with the trunk. The butt of your spear fits into this angle while the shaft lies along the trunk of the thrower. You balance it there with a finger or two while you snap the atlatl forward. The device gives you a sort of extra wrist so that the spear heads for its target with great speed.

Errett had been fashioning spearheads, fitting the flint points into foot-long lengths of wood or bone. These "warheads" could then be splinted onto the long wooden shafts (p. 92) easily and were interchangeable. The flint points matched the Paleo-Indian originals.

comparing it to that shown by the hard plastic casts made of original edges.

From a range of about seven yards, Callahan struck the tough elephant hide again and again. Frozen though it was, he got penetration of two or three inches before the points snapped. The flint broke exactly the same as the originals. The scientists felt that the range was authentic, considering that the original mammoth or bison would be floundering in snow, surrounded by spearmen. You can picture the great beast, as bloody and bewildered as a bull well-stuck by picadors, finally allowing a couple of brave hunters near enough to jab it to death.

Once the prey was slain, hungry tribesmen would presumably have swarmed over it to hack it apart. So at Front Royal, Dennis' tribe followed suit, with one important difference. They attacked the carcass one by one, using an elaborate system of recording the movement and the force of the cutting tool—a system designed by Woody Seamone of Johns Hopkins University Applied Physics Laboratory. "This is new ground in this experiment," Dennis told me. "Other scientists have tried Stone-Age butchery, even on an elephant, but no one's recorded every move until now."

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its top a wooden beam jutted out so that a wire would drop directly over the meat that was about to be hacked up. Four other wires were stretched from posts around the animal so that they met at the same point, forming a horizontal cross. They came together, along with the vertical wire, at a junction box that was fitted onto the knife handles, and since the anchored ends were spring-loaded, they held the knife in equilibrium over the elephant.

Each wire activated a potentiometer, allowing every movement the knife made —every sawing stroke, or twist or plunge —to be transmitted to a polygraph as a varying electrical impulse. Needles recorded these movements as wavering lines on a graph. Analyses would give a good idea of the human effort expended on the butchery.

And so the process begins. "Who wants to try?" Dennis sings out. Some brawny scientist would step forward. A knife would be chosen from the many that had been prepared. The butcher would then "spike" the polygraph by raising and lowering the knife. This produces a distinct mark on the polygraph to show where the new carver takes over.

He would set to work, sawing away with his flint blade. Dennis would de-

Rob Bonnichsen smashes 21-pound rock on humerus to get spiral fracture.

Stone ax in Errett Callahan's sheath was used to chop trees for levers.

scribe the action into a tape recorder, sounding like an anthropological Howard Cosell: "He's starting out strong, sawing at the epidermis, using one hand right over the blade and the other on the handle. He's finally made a penetration, but the effort has cost him. He's fading fast in the clutch. . . ."

The motions of the knife were thus recorded on both graph and tape. Every so often a tiny rasping sound would indicate that flint was flaking from the cutting edge. Action would stop immediately while the team crowded around to scrutinize the worn blade, seeking comparisons with the well-used tools of the Stone Age. A new blade would be put to work while a cast was made of the old one (pp. 88-89). These served as records of the fresh blades and their various stages of usage.

New blades were fashioned by scientists who were especially good at the tedious business of flint knapping. Using a piece of bone or antler—only a Stone-Age tool would do—these patient experts tapped gently against the side of the cutting edge. Instead of dulling the blade, this breaks off flakes from the other side, leaving the edge sharp enough to shave with. The same effect can be achieved by gently grinding a wood or bone implement against the flint edge. Sometimes, as the

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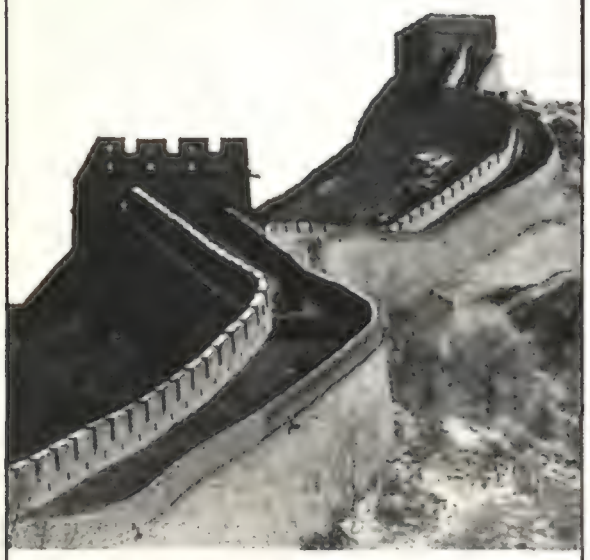

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Forest of spear shafts, some fitted with Stone-Age points, is ready for use.

Callahan, with spear-thrower, could penetrate Ginsberg's thick, frozen hide.

team noted, flaking that occurred while the blade was used sharpened it.

Stanford's blades were then simply cemented into wooden holders. This was a clear case of anachronism, but the time saved made the difference between conducting a scientific experiment and suffering through a nose-holding ordeal. And, anyway, no true Stone-Age cutter would have had that round wire junction screwed into the handle of his knife. If the experiment demanded that change, it could also accept the cement.

To show how Paleolithic blades were presumably fitted to their early handles —long since rotted away—the redoubtable Errett Callahan bound some into split wooden shafts by using Ginsberg's tired tendons. As these tough, cold strings emerged from the stone-sliced meat, Errett hacked them away, stuffed them into his mouth and chewed them. "Why do you do that?" I asked him, aghast.

"Makes 'em soft," he mumbled, an odd string, still slightly meaty, hanging out of the side of his mouth like a wisp of cold spaghetti.

Once Errett had softened the tendons to his taste, he bound them tightly around handles and blades and set them in the sun to dry. And as they dried out they shrank and tightened, making the blades as firm as if cemented.

The cutting on Ginsberg's upper foreleg neared the bone. Someone was sawing away, sweat starting to bead his forehead on this cold March afternoon. Suddenly there was a distinct rasping sound. The butcher stopped; the watching anthropologists crowded around. Dennis, clutching the microphone of his recorder, got more excited than Cosell at his worst. "We have a bone here! He's struck the humerus! The knife is flaking badly! We have heavy wear every time the blade touches the bone. . . ."

And sure enough, a massive bone began to appear through the raw meat like a white whale surfacing. Black flint flakes showed where the knife had scraped it. Obviously, stone tools would not work on it, but a bone tool, hammered by an antler, helped clear away the meat.

"Let's see if we can get a spiral fracture," Dennis said. He explained to me that only this kind of fracture produced the sharp edges that would have turned bones into cutting tools.

Rob Bonnichsen, of the University of Maine, beat a rock on the exposed bone. It left a dent and not much else.

"Climb up over the bone and heave it down," someone else suggested.

Crash. Bounce. Suggestion of a fracture along the humerus.

"Let's get a rounded, stream-bed rock

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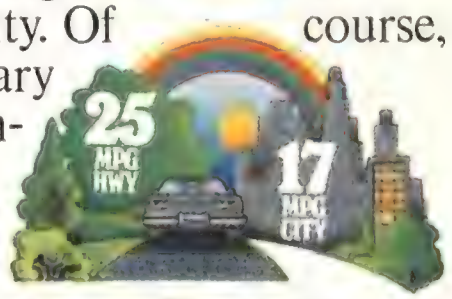

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Large bone core flake from Ginsberg (left), hand-prepared, matches the 30,000-year-old specimen (right) found in Yukon. This too, then, was man-made.

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so that it will have a better strike area," another anthropologist said.

Long wait while jeep is backed out through the snow and goes rattling down the hill. Wind whistles. Flint knappers tap away purposefully. Callahan thoughtfully munches a mouthful of Ginsberg's ligaments. Stanford makes some fresh molds. Photographers make a few shots. People fuss with the polygraph in the trailer. I shiver.

At last the Jeep rattles back up the hill with a couple of fine, heavy, well-rounded rocks. Bonnichsen mounts the carcass (p. 90) and poises a 21-pound rock over the bone. For a moment, if you squint your eyes, you see him as a skin-clad Paleo-Indian at a primordial kill.

Down comes the rock with a satisfying crunch. Up rises a cheer. The bone shows a distinct fracture, and it's the spiral break everyone wanted. Now all that remains is to pry the pieces apart. They use an antler wedge, clearing away the meat and the periosteum so that the fracture can be wrenched apart.

As the bone wedge pries tendons out by the roots, Dennis notices small depressions on the bone where they had been attached. The marks match those he has found on paleolithic bones. Other anthropologists thought they were caused by the teeth of carnivores. Stanford has displayed another cause. Moreover, we are using the bone wedge exactly as the ancients may have done thousands of years before the more exclusive use of stone tools. We are following the pattern.

In fact, our use of bone tools on Ginsberg is prying open the door to the distant past for a reexamination of long-held beliefs about the first settlement of North America. Anthropologists have generally believed that bone fragments 20,000 or 30,000 years old resulted from natural breakage. But Dennis Stanford has considered that the ones he has found in certain of his excavations were man-made. Those we are breaking now, in order to simulate tools, closely resemble those Dennis has found in his sites. As tools, they work well. The wear they show matches that on the ancient bones (above).

Now, if Dennis can convince his anthropological peers that the primordial bone fragments he has found were broken

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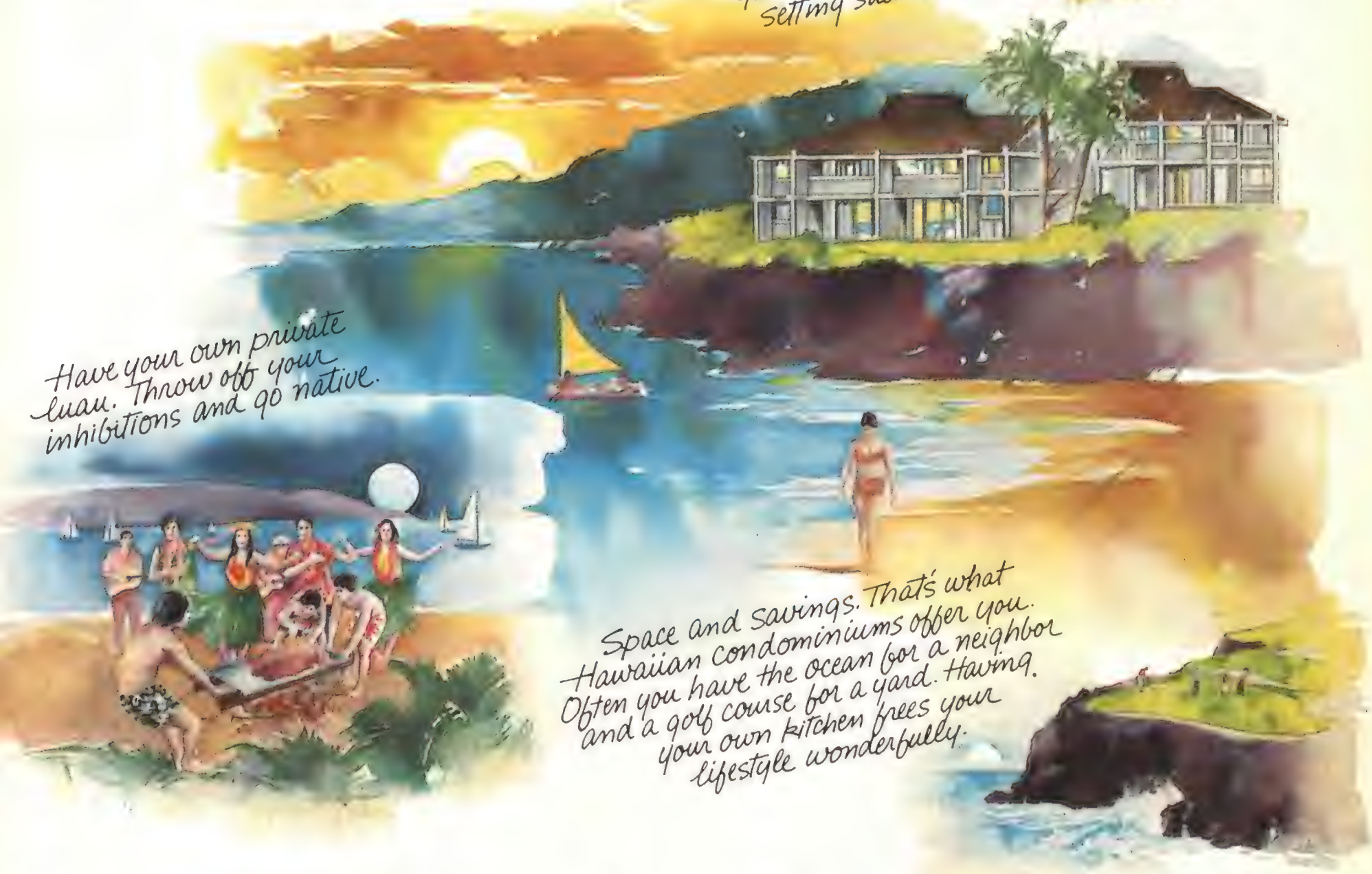

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deliberately and shaped as tools—such as these at Front Royal—"we will double, if not triple, the antiquity of Man in America," to use Stanford's words.

We? I have not realized how involved I have become. In this secluded setting with its late afternoon mountain chill, with these wild-haired young people surrounding me, bloodstained to their elbows, I have slipped back to the primordial. Me cold. Me hungry. Ginsberg's steaks look better and better. I'm in the mood to chew a ligament.

Perhaps noticing a newly Stone-Age look about me, Dennis offers me a chance with a knife. Gladly I seize the blade, "spike" the graph and begin carving. Once through the skin, the knife cuts beautifully. The serrations caused by knapped flint work on the meat like a saw. In short order I have a lovely steak. The only trouble is, no one can eat it. The tranquilizer that brought Ginsberg down pollutes her meat so it will simply be rendered into fat.

But Ginsberg has served us well. She's provided Dennis Stanford and his crew with the first thoroughly documented reenactment of Paleo-Indian butchery. And she's turned me, for a moment, from a perfectly ordinary wage-earner who moans about inflation into someone quite different. For if a hirsute, grease-smeared, skin-clad hunter of 9000 B.C. had approached me on that bleak hill while I was cutting away my slab of meat, I would have guarded it with a bare-toothed snarl.

Author gives it the old Stone-Age try as Dick Morlan (left) of Ottawa helps.

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The bologna sandwich earned our lowest vote of confidence.

Consumer Reports explored this in detail in its article "How Good is the Bologna in that Sandwich?"

Here's how bologna stacked up against the other three sandwich foods... (1) Highest in cost-per-ounce of protein (2) Highest in fats and calories. The bologna sandwich, in fact, was over *four* times as expensive as the cheapest sandwich—peanut butter—at the prices prevailing when we made our test. What's more, bologna contains a potentially harmful additive called sodium nitrite.

Consumer Reports gives you the facts behind the "baloney".

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Book reviews

The Hog Book
William Hedgepeth
(Doubleday, $10)

This is a book about learning to love hogs. In an effort to allay our society's thoughtless derogation of hogs, William Hedgepeth takes us back through history to the proud origins of these much-maligned creatures. The hog, it appears, was not always fat and muddy. Once lithe, fast, strong and resourceful, its decline was a result of its intelligence and its ability to adapt to increasingly smaller quarters. It is Man's domestication of the hog which accounts for its degradation, and it is, therefore, Man's responsibility to educate himself out of his prejudices.

The fact is that hogs have remained "structurally intact" for millions of years. This evolutionary persistence "connotes something seemingly everlasting and serene—and hence [the hog] tends to be agonizingly uncomfortable to man, both as a concept and, God knows, as a ubiquitous creature with which to cohabit the earth."

The author, a hogophile if ever there was one, does not present an unbiased picture. The book is essentially an encomium to hogs interspersed with harangues about pork producers, swine scientists, consumers and other manifestations of Man's inhumanity to pig.

He claims pigs have been a vital historical force, playing roles in such disparate events as the Sepoy Rebellion of 1857 in India and World War II. Even "Uncle Sam" does not escape the hog's influence. "Uncle Sam" Wilson, the story goes, was a New York pork packer during the War of 1812 whose barrels of pork, destined for the soldiers, were marked "U.S." Word spread that "Uncle Sam" was feeding the whole army and he quickly became the embodiment of federalism itself.

The book has several wonderful moments: some splendid hog poetry (even hog haiku), including the author's own "I See by Your Outfit That You Are a Duroc," apparently to the tune of "Streets of Laredo"; a lyrical description of "A Day in the Life [of a Hog]"; and a brilliant tour de force entitled "Festival for the Re-Deification of All Hogdom and Memorial for Porkers Past."

Mr. Hedgepeth is a talented writer; perhaps he writes a bit too well, for he overdoes it. The book is too long by half and there seems to be no end to the atrocious puns (*i.e.* "boars will be boars") or the cloying commentary. For example, after a hilarious recounting by Farmer X about a man decimating his house with an electric saw, we must endure this: his two sons were "busily beating swords into plowshares. Meanwhile, Mrs. X was out back diligently locking the barn door after the horse had fled."

Not satisfied with these gimmicks, the author uses two tawdry truckers named Hoover and Moon to weave continuity into the story. This pair, presumably bastard sons of Rosencrantz and Guildenstern, serves only to interrupt the narrative with their hillbilly antiphony.

In spite of these stylistic shortcomings, the book does succeed in its purpose: hogs seem decidedly more appealing. In fact, one comes away with the feeling that they have been, in Samuel Johnson's phrase, "a race unjustly calumniated. Pig has, it seems, not been wanting to man, but man to pig. We do not allow him time for his education. . . ."
—*Jill Merrill,* Washington-based freelance writer.

The Virginia Journals of Benjamin Henry Latrobe 1795-1798 (two volumes)
Edward C. Carter II, editor; Angeline Polites, associate editor
(Yale University Press for The Maryland Historical Society, $60)

In 1795, Benjamin Henry Latrobe boarded the American vessel *Eliza* at Gravesend, England, bound for Richmond, Virginia, which he intended to make his new home. For 15 weeks he endured "dirt and disappointment," suspicious and morose passengers, a crowded and filthy cabin, moldy and maggoty bread, chickens "protected by their age" from being eaten, tainted meat and a captain who added to malice and personal vulgarity a total carelessness concerning the well-being of passengers, crew or ship.

Despite his misery, Latrobe found much

True "hogritude" calls for many cozy, meditative afternoons.

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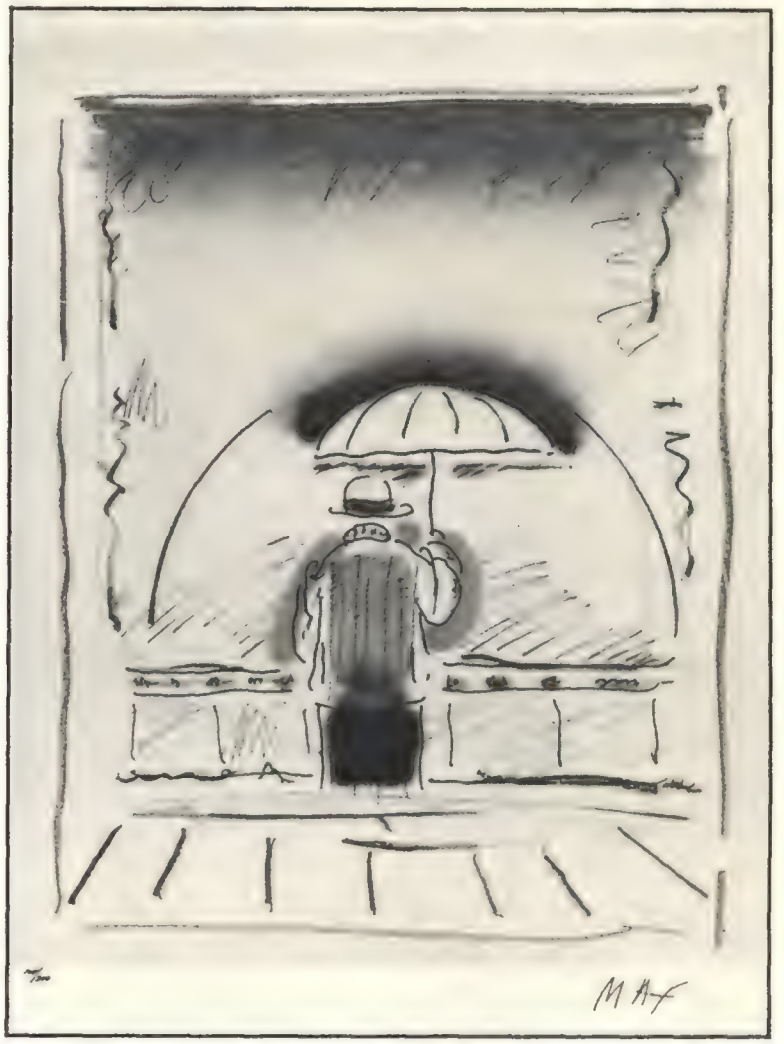

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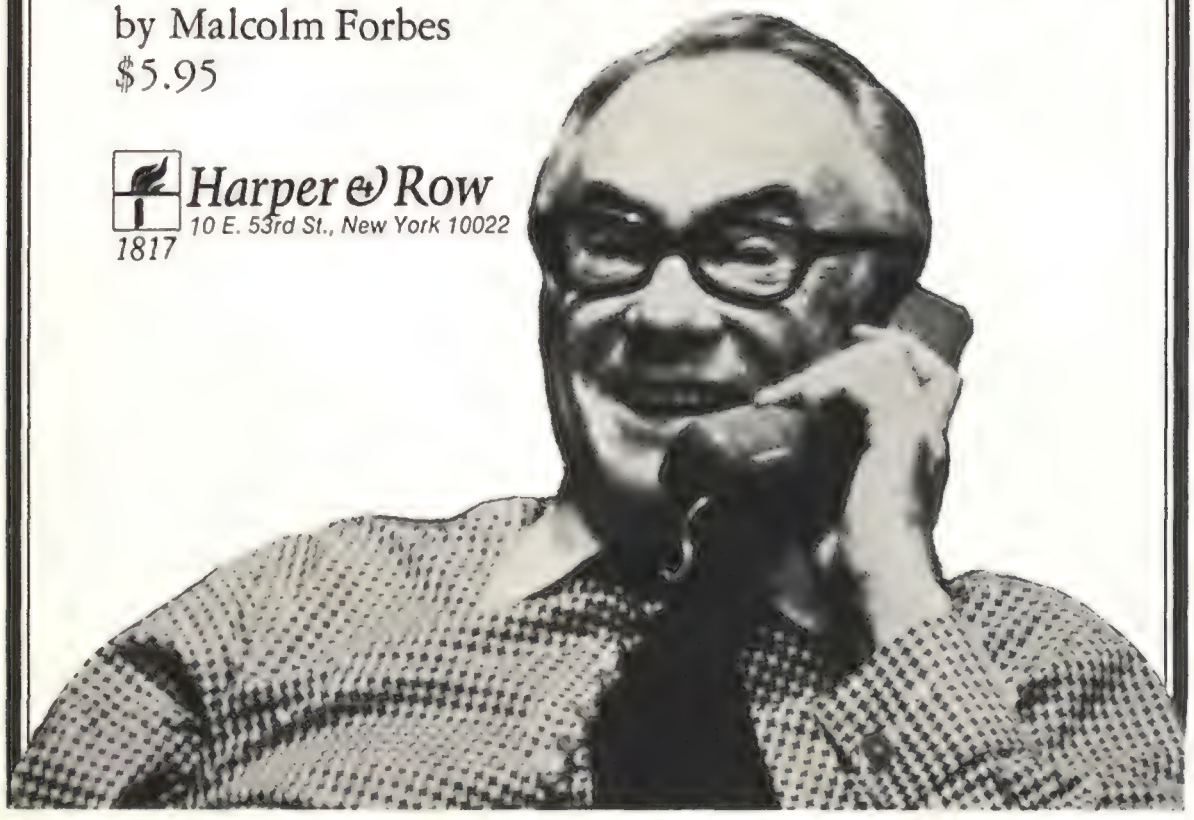

to delight in: "The dark Ocean agitated into mountainous waves," the "majesty" of Pico in the Azores, the "incomparable form and color" of dolphins, the elegance of flying fish, the beauty of sunsets —all stirred his love and awe of nature and gave rise to a gentle philosophy that is as important a part of his journal as are his complaints.

Reaching Virginia in March 1796, Latrobe describes the flora and fauna of the Virginia countryside in the same vein. Descriptions of houses, plantations, creeks, boats and ordinary wagons alternate with anecdotes about the local inhabitants and scientific observations of trees, snakes, snapping turtles, rivers and marshes. The journals ramble disconnectedly but pleasantly, digressing according to the twists of Latrobe's associations and memories.

Since Latrobe was an urbane and cultivated English gentleman with a perceptive eye and a sharp intelligence, his ramble takes us down interesting roads and side lanes of post-Revolutionary Virginia while introducing us to the strengths, prejudices and limitations of its rough rural society. Discussions of gambling, racing and what he calls "ennui drinking" lead to informed comments on the social effects of the absence of cultural interests. Hatred of the British which, in Virginia, he finds equated with republicanism, does not, however, extend to the aping of British dress and manners. Indeed, he would preach more love and less imitation. Attendance at Richmond law courts recalls the English "adoration" of the wig, and the meaning of that symbol in British society.

Pretensions of aristocracy of the Virginia gentry jar his democratic sensibilities: "The title of Baronet," he comments, "is a phantom even *in England,* having no real priviledge [sic] annexed to it, here it is the lank Ghost of a phantom, the shadow of a shade." And although he is ready to accept and appreciate the "delicacy" of Virginia ladies, he finds it strange that they are not offended by "the naked little boys and girls running about every plantation . . . the known promiscuous intercourse of . . . servants, the perpetual pregnancies of . . . young servant girls. . . ."

What emerges from this collection of journals, letters and essays (among which is a most interesting essay on landscape painting) is a sympathetic autobiographi-

cal picture of Benjamin Henry Latrobe, English-born and -trained architect and engineer whom the editors call, with justice, "the father of the American architectural profession."

Latrobe left such monuments as the Baltimore Cathedral, the Bank of Pennsylvania and the Capitol of the United States. His journals reveal him as restless and imaginative, impelled as much by curiosity as by ambition to seek new experiences and new solutions to the problems that beset mankind. Certainly these qualities, together with humor, perceptiveness and an immense amount of good sense, make these two volumes of the projected ten-volume *Papers of Benjamin Henry Latrobe* a delight to read and a joy to examine. Illustrated with Latrobe's own watercolor sketches and handsomely printed, the *Journals* should be a welcome addition to the libraries of not only those who collect Americana, but who enjoy the discovery of Man's inexhaustible capacity to find meaning and pleasure in all of life's experiences.
—Lillian B. Miller, editor of
The Charles Willson Peale Papers,
National Portrait Gallery

In Search of Buddy Bolden
First Man of Jazz
Donald M. Marquis
(Louisiana State University Press, $9.95)

Years ago, walking through a remote Japanese village in the middle of the night, I was astonished to hear wafting from a farmhouse the lyrics of a Jelly Roll Morton record: "I thought I heard Buddy Bolden shout, Open up that window and let that bad air out. . . ."

This was long before jazz had become popular in Tokyo, yet up there in the distant snows of Hokkaido some Japanese was listening to the story of a legendary New Orleans black musician who was scarcely known even in Louisiana. Charles "Buddy" Bolden deserves to be known; indeed, he deserves to be celebrated, as the founder of an art form. Bolden may not have "invented" jazz, but he was unquestionably its first important figure.

Donald M. Marquis' meticulously researched book is the first thorough attempt to untangle the Bolden legend and to document what can still be learned about the powerful cornet player who quit playing about 1906, and then languished for 24 years in an insane asylum,

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— Frederic Remington, 1895

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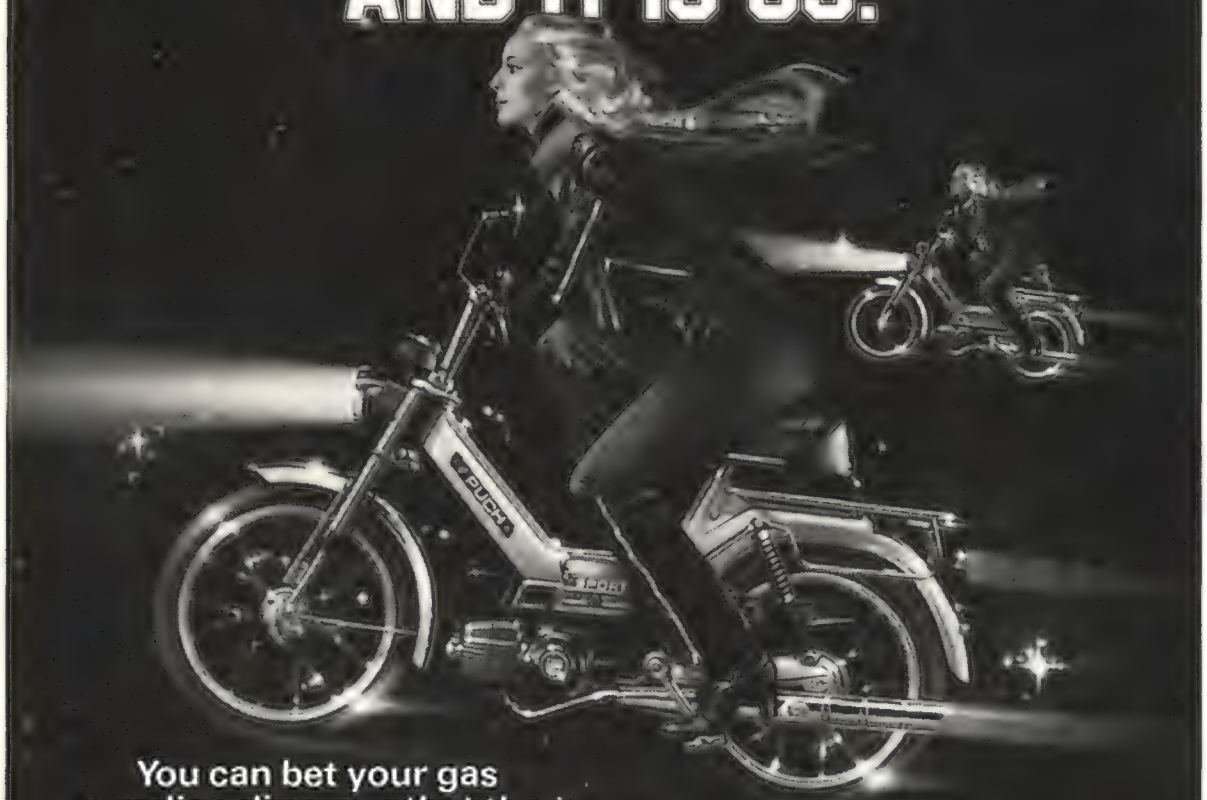

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ignored and uncaring, while the music he shaped spread around the world.

Marquis' first task is to demolish the myths about the first man of jazz. Much of what we have heard about Bolden in the past, little as it is, turns out to be wrong. Earlier accounts held that Bolden was a barber who edited a scandal sheet called *The Cricket* and played for dances at Tin Type Hall. Bolden was neither a barber nor an editor, Marquis tells us, and Tin Type Hall never existed.

Even Funky Butt Hall, where Bolden did work—the name referred to the foul, sweaty atmosphere of a Saturday-night dance hall—was in fact Union Sons Hall. (The Louisiana State Office Building now stands on the site, and in its files is Bolden's death certificate.) Two bits of the accepted legend, however, are true: Bolden drank a lot, which may account for his commitment to the asylum, and he played loud.

"Bolden would blow so hard, he actually blew the tuning slide out of his cornet and it would land twenty feet away," one musician said. This is physically impossible, but another recollection may be a genuine indication of how infectious his music was: when Bolden's band played *Home, Sweet Home* for the embarkation of a Negro regiment sailing for Cuba in the Spanish-American War, "some of the men on board were so overcome by nostalgia they jumped off and swam to shore."

We will never know just how Bolden sounded. There is a persistent rumor that his band made a cylinder recording, but it has never been found. And those who heard him, disagree about his playing. Trombonist Bill Matthews said, "He was the sweetest trumpet player in the world. . . . Louis Armstrong, King Oliver, none of them had a tone like Bolden." According to Kid Ory, however, "he was gifted, playing with effect, but no tone."

Unlike many New Orleans musicians in the 1890s, says Marquis, Bolden probably developed his style more by playing in little bands for dances and parties than in brass-band street parades. To win the crowds away from other bands, he evolved a novel approach of "playing 'wide-open' on the cornet and of playing in up-tempo or ragging the hymns, street songs and dance tunes to create a musical sound that people were unfamiliar with." That new musical sound, hot and dirty, was the birth of jazz, and the man who

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played it was known as "King Bolden" until he was sent to the state insane asylum at Jackson, Louisiana, in 1907. He was there until 1931, when they carried his body out in a pine box and put it in an unmarked grave.

In Search of Buddy Bolden is a valuable piece of work, but it is likely to appeal only to committed jazz fans or those interested in New Orleans history. Marquis gives us pages of maps, street addresses, parish records and other municipal memorabilia. He has even found a previously unpublished portrait of the pioneer cornetist. If only he had managed to find that fabled cylinder recording of his music!

—David Lancashire
The Globe and Mail, Toronto

The Other Half
Kenneth Clark
(Harper and Row, $12.95)

This is the second and, presumably, final volume of memoirs from the former director of England's National Gallery and the creator of the highly successful *Civilisation* series for television. The reader of Lord Clark's first autobiographical book, *Another Part of the Wood,* is likely to remember best the sunny tone that suffuses the author's recollection of his early life. The most frightening events are described with hilarity; recalling that his wife Jane, pregnant with twins, flipped her car and demolished a lamppost, Clark notes that the accident took place "conveniently" in front of a hospital and that the convalescent patients on the lawn were delighted with the spectacle. His insouciance in those days was apparently limitless, and even in the shadow of World War II, Clark wondered elatedly if the approaching firestorm might not have the positive effect of purging an outmoded economic and social system.

But the tone in *The Other Half* is distinctly less detached. And for good reason: in this volume Clark must review not only his triumphs, which are many and varied, but also the war, the illness and death of his beloved Jane, and the disappearance of a treasured past. Trying to locate some of the vacation landmarks of the Riviera that he remembered from his youth, Clark laments that "We loved it all, and, like so much that we loved, it is all gone."

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cally by a simple, perdurable idea: that the ability to respond strongly to works of art is a lifelong and inexhaustible resource. Clark claims that he never suffered from a sense of duty, that his career of sharing esthetic pleasure with others can be traced to a total incapacity for self-restraint in the face of humanity's great creations. As in *Another Part of the Wood,* here Clark proves that information is made memorable only when it is colored by arbitrary opinions, evident in his statement that, to give an example, Jackson Pollock "is the archetypal American painter, as Whitman is the archetypal American poet."

So Clark's friendly self-confidence continues to be the best recommendation for his belief in the life-giving power of art. Indeed, there are moments of sheer joy in *The Other Half,* and Clark says that his 68th year, when the *Civilisation* series was finished, was his happiest. But someone who can identify a single year of his life as the happiest knows experientially that our days are alternately joyful and sorrowful, and when Clark refers at one point to "the happiness that I used to take for granted in the past," it is hard to read those words without a wince.

Is it true, then, that it is better to be young in the worst of times than old in the best? Maybe, but if Clark thinks so, he isn't saying. Clark avoids extremes, except in matters of esthetic judgment, and one comes away from his memoirs with a sense of a course well steered, especially when one realizes that so many of the narrative's minor characters, and a fair number of the major ones, either shoot themselves or drown in alcohol. Perhaps the best companion volume to *The Other Half* is not its predecessor but Wallace Stegner's novel *The Spectator Bird,* whose narrator reviews, from the standpoint of his declining years, a life that has had its share of heartache, yet a life in which self-cultivation and self-discipline have not only mitigated the pain but also proved to be of inestimable value.

At any rate, Clark does not make a tragedy of the inevitable, and after describing the final illness and death of his wife, he writes that "It now remains for me to see what I do with my life." On closing this book the reader will feel that he has lived for a while in a world of rich textures, of sad beauty.

—David Kirby

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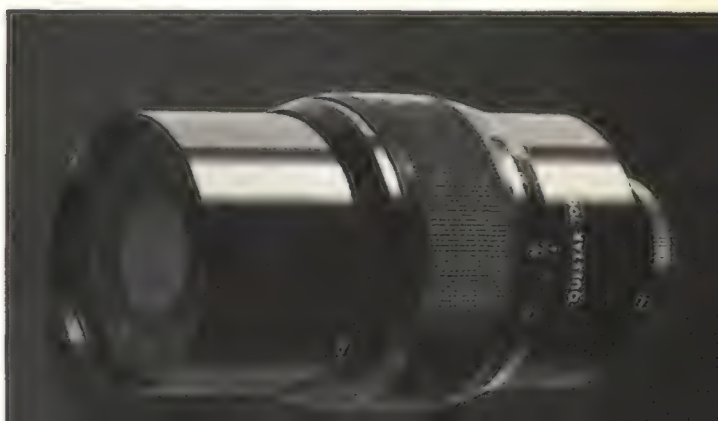

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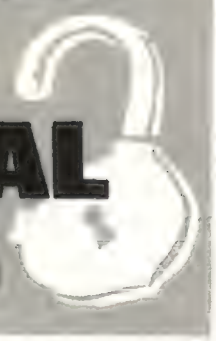

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A Manual for Neanderthals by H. McWhinney, University of Texas Press, 1957

Lithic Technology: Making and Using Stone Tools, edited by Earl Swanson, Mouton Publishers (The Hague), distributed in the USA and Canada by Aldine (Chicago), 1975

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Smithsonian highlights

Independence Day festivities

Tap dancers, jugglers, roving troubadours, an organ-grinder and Uncle Sam will lure Smithsonian visitors to the building and grounds of the Museum of History and Technology for its second annual four-day celebration of Independence. The festival of music, dance and unusual crafts is expanded this year to include four afternoon concerts (4 to 6 P.M. in the amphitheater east of the museum), and four outdoor dances, each with a different band (6:30 to 8:30 P.M. near the amphitheater).

On July 1 the music and dancing are to be in the Big Band tradition, with lessons available in bebop and the Big Apple. Gospel and traditional jazz is the theme for July 2, with pointers offered on tap dancing and jazz steps. On July 3 visitors can listen to Blue Grass music in the afternoon and stay on to learn some early Victorian ballroom dances. Contradancing, including the Virginia Reel and other late 18th-century dances, winds up the free series of public parties on July 4, just in time to allow dancers to catch the fireworks display on the Mall.

Children may enjoy dancing with Abe Lincoln as they did last year, but they can also be guided in constructing one of 18 paper-boat models, watch the feuding between Punch and Judy at the puppet theater, follow the organ-grinder's monkey, be made up to look like clowns and listen to one of five or six musical groups that will be wandering about the museum every day of the festival. The parties are brought about through the efforts of the museum staff and the staff of the Division of Performing Arts.

July openings

Jay Gould, the Mephistopheles of Wall Street
Furnishings from Gould's home, his portrait by Eastman Johnson, a brass model of his private railroad car and a watercolor of his yacht will be exhibited at the National Portrait Gallery, opening July 21, to run through February 4, 1979.

William A. Conklin: Inner Dimensions
An exhibition of more than 60 photographs by Conklin opens July 15 at the Museum of Natural History.

Printed, Painted and Dyed: The New Fabric Surface
This exhibition at the Renwick from July 4 through October 15 includes approximately 40 works by 30 craftsmen. All works use preconstructed fabric surfaces on which dye techniques, printing, photo-silkscreen and color xerography are employed for color and design.

Flying for Fun
This National Air and Space Museum gallery is now open, exhibiting a permanent selection of powerless craft. The exhibits stress kite flying, sky diving, soaring, hang gliding and model planes.

Isis unveiled
A Mark di Suvero sculpture, *Isis*, is to be dedicated on the plaza at the Hirshhorn Museum and Sculpture Garden July 19. The work is made entirely of scrap metal, a bow to the commissioning organization, the Institute of Scrap Iron and Steel, which is giving it as a gift to the American people.

Continuing exhibits

National Collection of Fine Arts
"Past and Present: A Century and a Half of a National Collection," including 200 works from the NCFA collection, continues through September 4 (see pp. 48-55).

National Portrait Gallery
"The *Time* of Our Lives" continues through August 30 with a selection of the artwork for 107 *Time* magazine covers.

Try lunch at Patent Pending restaurant in the NCFA-NPG building, with courtyard seating. The menu includes sandwiches, salads and home-style soups.

Hirshhorn Museum and Sculpture Garden
" 'The Noble Buyer': John Quinn, Patron of the Avant-Garde," (pp. 76-83) exhibition of 79 paintings, sculptures and drawings—through September 4.

Cooper-Hewitt Museum of Design
"Embroidery Through the Ages," two exhibits of embroidery, are at the New York museum through September 3.

Smithsonian Institution Traveling Exhibition Service

SITES circulates exhibitions to hundreds of cities throughout the United States. For a list of shows and locations write: Eileen Harakal, SITES, Smithsonian Institution, Washington, D.C. 20560. A partial list of summer openings follows.

- Valdez, Alaska—"Know What You See: the Examination and Treatment of Paintings" focuses on the art conservators' techniques for examining paintings with use of photo-optical means (xray, infrared and ultraviolet light). The show runs July 29 through August 27 at the Valdez Heritage Center.
- Canoga Park, California—"Coast to Coast Coasters" brings the history of the roller coaster to the Topanga Plaza Businessman's Association July 29 through August 27.
- Gainesville, Florida—"Hungarian Art Nouveau" is to be exhibited at Santa Fe Community College July 1 through August 6.
- Logan, Kansas—"Folk Woodcuts of Brazil's Northeast" is on view at the Dane G. Hansen Memorial Museum July 1 through 30.
- Carson City, Nevada—"Exhibition Flight," a new show drawn from the Air and Space Museum's collections, features barnstormers; at the Nevada State Museum from July 29 through August 27.
- Buffalo, New York—"Images of Old Age in America," is on view at the Erie Savings Bank from July 20 through August 20.
- Odessa, Texas—"Folk Art and Crafts: the Deep South" brings photos, quilts, needlework, paintings, baskets and musical instruments to the University of Texas of the Permian Basin from July 1 through 30.
- Milwaukee, Wisconsin—"Shaker Built" is to be exhibited at the University of Wisconsin Library, opens July 22.

Peugeot 604. Europe is no longer keeping the best for itself.

The 604 is the best Peugeot made. And one of the best European touring sedans ever made. Every inch of the Peugeot 604 says luxury. And says even more about the person who owns one... without shouting.

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Exploring the World with the Smithsonian

For both the seasoned and would-be traveler, the Smithsonian has developed a travel program to meet a variety of tastes and budgets. In order to accommodate the increasing growth and interests of Smithsonian Associates, the tour programs have expanded, bringing travelers to places reflecting the Institution's interests.

Three types of trips are available, Charter, Domestic and Study, each with its distinct character. Foreign Study Tours provide small groups with culturally oriented, specialized trips, under the guidance of museum curators or experts in respective fields. Foreign Charter Tours, consisting of several small groups under the leadership of skilled guides and interpreters, are lower in cost, combine study, discovery and vacation. Domestic Tours offer specialized guidance and expertise generally unavailable to persons traveling on their own.

Foreign Charter Tours

Paris and Provence*—September 4-18: Combines the excitement of Paris with the great natural beauty of Provence. Special seminars at the Louvre and Pompidou Center; walking tours of old and modern Paris; excursions to the Loire region, Chartres or Reims. Travel by train to Provence with visits to Avignon, Arles, Nîmes and Aix-en-Provence.

Japan—November 5-21: The heart of historic Japan with an extended program in Kyoto and Nara followed by choice of travel seminars to the Inland Sea, the Sea of Japan or Kyushu. Conclude in Tokyo with visits to Nikko or Kamakura. Visit ancient temples, castles and shrines with expert study leaders. (Originates and ends in San Francisco.)

New Zealand and Fiji—February 21-March 11: Departing Los Angeles, this tour includes Mt. Cook, Te Anau and Milford Sound, plus Auckland, Rotorua, Wellington and Christchurch. Included will be talks on New Zealand's natural history, Maori heritage, parliament, plus a home visit. Brief rest stop at Fiji before return flight to the West Coast.

Winter Russia*—December 28-January 11: Includes the historic and diverse cities of Leningrad, Tallinn and Moscow plus optional two-day excursion to Vladimir and Suzdal; attend special Winter festivities including gala New Year's Eve party and a traditional troika ride; view the treasures and palaces of Czarist Russia; life-seeing visits to schools, factories or clinics; attend the Russian theater and the circus.

Low cost of tours includes first-class hotels, most meals, sightseeing, lectures, theater tickets and air fare. *Optional predeparture course will be available.

Write Smithsonian Associates Travel Program, A&I 1278, Smithsonian Institution, Washington, D.C. 20560 or call (202) 381-5635 for brochures on specific tours.

Domestic Study Tours

Desolation and Gray Canyons—September 29-October 9 or October 10-20: White-water trip for the adventurous; explore the geology, wildlife and exciting Indian and outlaw history of Utah's Green River.

Williamsburg Family Weekend—August 10-13: A repeat of our popular program for children ages 7 through 14 (and their parents) to learn about 18th-century life through participation in special tours.

Canadian Rockies—September 7-17: Meet in Vancouver for an overnight train trip to Lake Louise. Discover Alberta's scenic beauty and natural wonders on daily hikes at Lake Louise and Banff Springs.

Toronto—September 19-25: Special program of museum lectures and walking tours to experience the exciting diversity of this city's art and architecture. Also visit Stratford Shakespeare Festival and Niagara Falls.

Weekend at the Hirshhorn Museum and Sculpture Garden—September 22-24: A weekend devoted to the Hirshhorn's exemplary collection of 20th-century painting and sculpture, with films, walking lectures and discussions.

Mesa Verde and Chaco Canyon—September 24-October 2: Enjoy autumn colors in the Southwest while learning about the history of the Pueblo Indians through visits to important archaeological sites and Canyon de Chelly, Arizona.

California Wine Country—October 1-7: From San Francisco, visit selected vineyards in Napa, Sonoma, Santa Clara and Monterey with wine tasting and special lectures by vineyard owners and discussions with wine masters.

Illinois Archaeology—October 14-21: Join archaeologists in the excavation of an Illinois River valley site spanning almost 10,000 years. Actual digging will be supplemented by instruction, lectures, laboratory work and field trips.

Colonial Williamsburg—October 25-29: This program for adults, with accommodations at the renowned Williamsburg Inn, will examine life in the 18th century, with special tours and programs on the architecture, gardens and archaeology of Williamsburg.

Washington "Anytime" Weekend: any weekend to visit the nation's capital and enjoy a special tour of the original Smithsonian building, spend two nights at Loew's L'Enfant Plaza Hotel close to the Mall, and see other sights in Washington by Tourmobile. Reservations and payments must be received at least ten days prior to arrival date.

Brochures on specific tours are available. Write Smithsonian Associates Travel Program, A&I 1278, Smithsonian Institution, Washington, D.C. 20560 or call (202) 381-5635.

Foreign Study Tours

Aegean Sites of Civilization—October 7-29, 1978: A cruise on MTS *Argonaut* with Dr. Richard H. Howland, including Thrace, Istanbul, Troy, Ionia, Mt. Athos, Mistra, Thera, Crete and principal classical sanctuaries, leaving from and returning to Athens. *Optional prelude may be the following:*

Nostalgic Orient Express—October 2-8: Vintage cars restored to superb condition, over original Simplon routing from Zurich to Athens (waiting list).

Iranian Art and Archaeology—October 16-November 4: Led by Dr. Michael Roaf of Oxford, stay two nights in London, then Teheran, Shiraz, Persepolis, Pasargadae, Isfahan, Arak, Ecbatana, Kangavar, Bisitun, Kermanshah, Taq-I Bustan, Qasvin, Varamin, Rey and Mashhad.

For detailed information, write: Miss Bliss Schumann, Foreign Study Tours, S.I. 123, Smithsonian Institution, Washington, D.C. 20560 or call (202) 381-5520.

Regional program invites cosponsors

Regional activities of the National Associate Program in 1978 included exhibitions, lectures, workshops and performing arts events in cities throughout the United States. Museums and cultural and scientific organizations interested in cosponsoring regional programs for 1979 may write: R. H. Angle, Smithsonian National Associate Program, 900 Jefferson Drive, Washington, D.C. 20560.

Radio Smithsonian

In July, watch for listings in your area of the Smithsonian's weekly radio program. During the week of July 2, a program called "The High Priest of the Temple" will transmit reflections by acting coach Lee Strasberg. During the same week: "The Art-Science Connection."

During the week of July 9, "Places of Discovery" will present a verbal tour of the children's and handicapped Discovery Corners at the Museum of History and Technology.

When visiting the Smithsonian

Members are invited to begin their visit by registering with the Associates receptionist in the Smithsonian Institution Building—the castle on the Mall. Here, between 10 A.M. and 4 P.M. daily, Associates receive special orientation materials to ensure a more enjoyable visit. Membership cards are replaced upon presentation of a SMITHSONIAN magazine address label. Here, too, the Associates Lounge offers a haven in which to relax. To aid in visit planning, members are encouraged to send a postcard or phone for an information packet: Associates Reception Center, Smithsonian Institution, Washington, D.C. 20560; (202) 381-6264. Please allow two weeks for receipt.

The Court

The Court, a restaurant for Associates only, located in the Museum of Natural History, offers buffet-style service daily at brunch, luncheon and dinner. Hours: brunch, 8:30 to 11 A.M. (entrance via Constitution Avenue); luncheon 11 A.M. to 3 P.M.; dinner, 4:30 to 7 P.M. Brunch is $2.95 for adults and $1.80 for children; luncheon and dinner are $3.95 for adults and $2.80 for children. Membership cards required for service.

On cultivating the vineyard for better wines.

Cultivating— which is simply the turning or loosening of the soil by mechanical means in order to control weeds and aerate the soil— might seem to some to be the most prosaic of all vineyard operations.

Yet, the truth is, we find its contribution to the production of fine wines far more complex than one might expect.

Weeds, to be sure, are undesirable. They compete with our vines for nourishment and moisture in the soil.

But that is only one reason we take great care to manage an efficient and extensive cultivation program.

Frost Protection

Our experience shows that a moist, clean vineyard— one without weeds— also offers our vines measurable protection against morning frost during March, April, and early May.

Normally, during the day, the soil is warmed by the sun's rays. Then in the early hours before the following dawn, the heat that has been absorbed by the soil is released in the form of radiation, thus warming the vines above.

However, if there are weeds growing on the ground, they will shade the soil. Thus, its temperature will be cooler than if the sun were striking it directly.

Since the temperature difference between a clean vineyard and one with weeds can be as much as six degrees, and since in most instances a mere three or four degrees difference between the ground and the air is enough to protect our vines' tender young buds against frost damage, we do everything we can to keep our vineyards clean.

Our goal, of course, is to ensure that the tender buds ultimately develop into the best possible grapes for our wines.

Pest Protection

Cultivation in the early spring also helps us control insects and pests by destroying their breeding places, above the soil and beneath its surface.

In our vineyards, we might point out, we probably do more cultivating than normal because we prefer not to use herbicides when we can avoid them.

That same policy applies to the use of insecticides. We prefer natural controls.

For example, in one of our vineyards, instead of spraying to eliminate the destructive leaf hopper, we planted a number of wild blackberry bushes nearby to provide a refuge for several colonies of wasps.

The wasps then laid their eggs within the eggs of the leaf hoppers and thus prevented them from hatching.

In another case, rather than spray with an herbicide to control a weed called puncture vines, we used weevils.

These natural enemies then burrowed into the germ of the puncture vine seeds and prevented them from sprouting.

By so protecting and nurturing our vines, we naturally improve the quality of the grapes that we grow.

Other Uses

We also rely on cultivation to enhance our fertilization programs.

Fertilizers— except for nitrogen and boron— tend to become fixed in the surface soil. In order to be sure that these nutrients reach the roots of our vines, we disk them under the ground.

Then, too, during vineyard operations, soil often becomes compacted, a condition that could destroy the vine's fine root system.

To rectify this situation, we cultivate and loosen the soil, thus providing the roots some growing room. Proper cultivation makes stronger vines, and stronger vines make better grapes.

Our Purpose

It is only by taking full advantage of all the opportunities available to us in the practice of cultivation—as in all the other facets of the art of viticulture— that we can hope to achieve our goal.

Here at the winery of Ernest and Julio Gallo, our purpose is to bring you the finest wine that skill and care can produce.

Ernest and Julio Gallo, Modesto, California

Write for "The Art of Creating Fine Wines"
E & J Gallo Winery, Dept. 18, Modesto, Ca. 95353

By Israel Shenker

Have you ever read something you literally couldn't put down, while literally glued or riveted to your chair?

Well, come off it. The chance of being literally fixed in place or literally holding a book you can't put down is about as small as the chance of being literally swept into office. Entreated, perhaps. Enticed, certainly. But swept? Not unless voters use brooms instead of ballots.

In the "literally" sweepstakes, politicians are among the prime offenders. During the 1976 Democratic National Convention, the late Senator Hubert H. Humphrey, whose presence was sometimes sufficient to galvanize the most somnolent audience, said that his friend Senator Edmund S. Muskie "literally sprang onto the national scene." Senator George McGovern, whose presence has been known to lethargize the most galvanized audience, suggested that the Vietnam War "literally tore the Democratic Party in half."

In *My Life,* Golda Meir tells of attending a performance of *Uncle Tom's Cabin.* "I can still recall jumping to my feet in the theater," she writes, "literally beside myself with hatred for Simon Legree." She can hardly forget the time she was "literally bombarded with cables," a battering that recalls one cited by Sir Ernest Gowers: "M. Clemenceau literally exploded during the argument."

Sir Ernest, in *The Complete Plain Words,* recalls the comment by *Punch* on a newspaper report that throughout a debate Gladstone sat "literally glued to the Treasury Bench": " 'That's torn it,' said the Grand Old Man, as he literally wrenched himself away to dinner."

Using "literally" when "figuratively" is intended is hardly a crime, but it doesn't testify to total innocence either. Professor Leon Lipson, who patrols the rules of language at the Yale Law School, and who is literally infallible in the use of "literally," suggests that "in an earlier form of lifted-pinkie discourse, the word that performed the function which 'literally' now performs was 'virtually.' "

In *Usage and Abusage,* Eric Partridge calls such resort to "literally" nothing less than "a slovenly colloquialism." Fowler's *Modern English Usage* laments that "such false coin makes honest traffic in words impossible."

In the ephemeral prose of journalists "literally" traces its ugly tread. *Publishers Weekly* wrote of critic Northrop Frye that he "literally weaves an enchanting prose tapestry. . . ." One New York morning newspaper described a woman "who literally fell through the cracks of a complicated bureaucratic system."

What could a system—however eager to help—possibly do for that fallen woman? What could anyone do for Betty Friedan, who suggested that her book, *It Changed My Life,* "quite literally has written itself. . . ."? Could anyone have encompassed the ubiquitous Hugh O'Brian? In a newspaper description of a seminar, he was "the man behind, in front of, and literally surrounding the conference."

One might just as well try coming to grips with the critic who wrote of Lorenz Hart's lyrics that they were "literally soft as down"; or attempt to explain gravity to a theatergoer of the era—quoted in Edgar Johnson's biography of Dickens—who said that as an actor Dickens "literally floated in braggadocio"; or seek to reason with the magazine writer who saw burial urns "quite literally kicking around in northeastern Thailand."

Any literal-minded observer would have to admit, however, that no one worked himself up into a lather with the abandon of Harold Laski, the late, eminent political economist. From Harvard, where he was lecturing in 1918, he wrote Justice Oliver Wendell Holmes, "I have been literally bathed in boys for a fortnight." Sailing home to England, he confessed, "I literally have no words to tell you what those days in Washington meant to me. . . ."

Was Mr. Laski really, that is literally, wordless, all at sea about how to proceed? Perish the thought. On he sailed.

Discovering Pascal, he reported being "literally swept away by the power he had to know the things that move one." Reading Sainte-Beuve, he exulted, "I literally could not put the book down. . . ."

Laski and a dozen students and instructors once entertained a visiting Japanese professor, and a student rattled off a list of mock-serious references for the professor to consult. When the visitor left, Laski reported, "We all literally rolled on the floor with suppressed emotion."

But supremacy in this exuberance of lowly rollers is too staggering a burden for a single culprit, and in fact it belongs to the collectivity of six scholars who laboriously compiled *Elementary Modern Standard Arabic.*

All hail the summitry of these linguistic genies' sentence beginning: "In his well-known book *Al-Rihla* (literally, 'The Pleasing Gift for the Onlookers with Regard to the Curiosities of Town and the Strange Sights Confronted in Travels')."

Now *that's* a "literally" that literally—well, almost literally—takes your breath away. It rivals the most accomplished feat of the incomparable S. J. Perelman, that oracle of purest fey supreme. A figure of faultless speech, eloquent silence and —under the usual circumstances—exemplary poise, Mr. Perelman was taken off-balance recently, as he was gathering wool. "You've caught me literally flat-footed," he said, shuffling uncomfortably.

Energy for a strong America

Nearly a third of the world's coal lies under the U.S. Dolly Monte is down there helping to get it out.

The U.S. has about 250 billion tons of coal that's economically minable with today's technology. This represents more than twice the energy in the proven oil reserves of the Middle East.

The coal that lies under the United States will help serve as a bridge between the world's finite petroleum reserves currently being depleted and the unlimited energy sources of the future—large-scale solar power, nuclear fusion and other advanced technologies.

A lot of coal lies close to the surface. But a significant amount is deep underground. And, since it can't be pumped out the way oil can, people have to go down and bring it up.

Dolly Monte is one of 500 employees in Exxon's modern mine in Carlinville, Illinois. She began as a general laborer, then joined a production crew as a shuttle car operator. "I'm really a truck driver," says Dolly, "but my 'truck' is 300 feet underground."

The mine doesn't look as you might expect. The walls are sprayed with white powdered limestone. The work areas are large and well ventilated.

In order to more than double coal production by 1990, the U.S. will need 200 new coal mines, producing an average 5 million tons a year. The work force will have to double. Thanks to modern technology, mining is becoming a job that many people, including an increasing number of women, are choosing.

Exxon has a growing commitment to coal production and research. For more information on coal as an alternate energy resource, write to Exxon Corporation, Dept. H, Box 4125, Grand Central Station, New York, N.Y. 10017.

The totally new Colt wagon. Isn't a Datsun. Isn't a Toyota. It's a lot of little Dodge.

The new 1978 Colt wagon gives you the kind of practicality and efficiency you've come to expect from an import (more about that a bit later). But it also features a brand-new long wheelbase. Low profile, wide stance. And generous glass area all around.

LOTS OF ROOM, LOTS OF LUXURY.
In addition to offering the luxury of real room, the new Colt wagon comes with an extensive list of standard niceties. Things like a trip odometer. Tinted glass all around. Electric clock. Rear window defogger. Color-keyed cargo mat. Luxury sport steering wheel. Tilt steering column. And a whole lot more.

NEW MCA-JET ENGINE.
A brilliant engineering achievement that manages to squeeze a lot of power out of 1.6 litres and still be rated by the EPA at 37 MPG on the highway, 27 MPG in the city.* And an optional 2.6 litre version with "Silent Shaft" design for incredibly smooth running.

OUTSTANDING ROADABILITY.
Other engineering features in this totally new Colt wagon include a new four-wheel coil suspension for quieter ride and improved handling. And plenty of road-grab from 14-inch wheels.

SOMETHING SPORTIER?
There's the available Estate Wagon Package (shown) that features exterior simulated wood-grained panels, luxury cloth interiors, carpeting, and floor skid strips for the cargo area.

See your Dodge Colt Dealer today. About buying or leasing a new Dodge Colt wagon.

Dodge

*EPA mileage estimates. Equipped with standard four-speed manual transmission and 3.9 rear axle ratio. Your mileage may vary, according to your car's condition, equipment, and your driving habits. California mileage lower.